Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

11-AMCP-0118

APR 06 2011

Ms. J. A. Hedges, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port off Benton Boulevard
Richland, Washington 99354

Dear Ms. Hedges:

CURRENT SOLID WASTE OPERATIONS COMPLEX WASTE ANALYSIS PLANS

This letter formally transmits the following Solid Waste Operations Complex Waste Analysis Plans:

- Central Waste Complex Waste Analysis Plan, HNF-1886, Revision 6;
- Waste Receiving and Processing Facility Waste Analysis Plan, HNF-2165, Revision 6;
- Low-Level Burial Grounds Waste Analysis Plan, HNF-5841, Revision 4; and
- T Plant Complex Waste Analysis Plan, HNF-9921, Revision 5.

These Waste Analysis Plans were provided informally to the State of Washington Department of Ecology (Ecology) on July 13, 2010, during discussions on the reissued Hanford Facility Dangerous Waste Permit. During the January 19, 2011, weekly Solid Waste Operations Complex permitting meeting with the U.S. Department of Energy Richland Operations Office and CH2M Hill Plateau Remediation Company, Ecology requested that they be formally transmitted.

If you have any questions, please contact me, or your staff may contact Larry Romine, of my staff, on (509) 376-4747.

Sincerely,

Jonathan Dowell

Jonathan A. Dowell, Assistant Manager
for the Central Plateau

AMCP:MSC

Attachments

cc: See page 2

cc w/attachs:
J. W. Biebesheimer, Ecology
G. Bohnee, NPT
L. Buck, Wanapum
D. A. Faulk, EPA
S. Harris, CTUIR
R. Jim, YN
S. L. Leckband, HAB
N. M. Menard, Ecology
K. Niles, ODOE
D. Rowland, YN (4) plus 2 CDs
Administrative Record
Ecology Library
Environmental Portal

cc w/o attachs:
G. A. Aljure, CHPRC
D. G. Black, CHPRC
A. E. Cawrse, CHPRC
A. G. Miskho, CHPRC
R. E. Piippo, MSA
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J. F. Williams, CHPRC

HNF-1886
Revision 6

Central Waste Complex Waste Analysis Plan

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

FLUOR

P.O. Box 1000
Richland, Washington

HNF-1886
Revision 6

Central Waste Complex Waste Analysis Plan

Date Published
March 2008

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

FLUOR.
P.O. Box 1000
Richland, Washington

A. D. Randal 04/10/2008
Release Approval Date

Approved for Public Release;
Further Dissemination Unlimited

EXECUTIVE SUMMARY

The Central Waste Complex provides storage, treatment, and confirmation of dangerous waste, Waste Retrieval Project waste, and/or mixed waste from onsite generators, onsite Solid Waste Operations Complex-generated waste units, Central Waste Complex-generated waste, or offsite generators (hereafter referred to as the 'generator' unless otherwise denoted in this waste analysis plan). The Solid Waste Operations Complex treatment, storage, and/or disposal units consist of Central Waste Complex, Waste Receiving and Processing Facility, Low-Level Burial Grounds, and T Plant Complex. This waste analysis plan provides processes to obtain information on the chemical, biological, and physical characteristics of the waste managed to meet the requirements of Washington Administrative Code 173-303-300, *General Waste Analysis*.

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CONTENTS

FIGURES

TABLES

ACRONYMS

ALARA	as low as reasonably achievable
AOAC	Association of Official Analytical Chemists
APHA	American Public Health Association
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Materials
CAP	corrective action plan
CCW	constituent concentrations in waste
CCWE	constituent concentrations in waste extract
COLIWASA	composite liquid waste sampler
CFR	Code of Federal Regulations
CWC	Central Waste Complex
DOE-RL	U.S. Department of Energy, Richland Operations Office
DQO	data quality objectives
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
HNF	Hanford Nuclear Facility (document identifier)
LDR	land disposal restriction
LLBG	Low-Level Burial Grounds
MSDS	material safety data sheet
NDE	nondestructive examination
NIOSH	National Institute for Occupational Safety and Health
PCB	polychlorinated biphenyl
PES	performance evaluation system
pH	negative logarithm of the hydrogen-ion concentration
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
RCW	Revised Code of Washington
SAP	sampling and analysis plan
SWOC	Solid Waste Operations Complex
T Plant	T Plant Complex
TCLP	toxicity characteristic leaching procedure
TPA or Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSCA	*Toxic Substances Control Act of 1976*
TSD	treatment, storage, and/or disposal

UHC	underlying hazardous constituents
WAC	Washington Administrative Code
WAP	waste analysis plan
WRAP	Waste Receiving and Processing (Facility)
WRP	Waste Retrieval Project

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	Meters	3.28084	feet
yards	0.9144	meters	Meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
Mass (weight)			**Mass (weight)**		
ounces (avoir)	28.34952	grams	Grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			**Volume**		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	Liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	Liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds (force) per square inch	6.894757	Kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Third Ed., 1990, Professional Publications, Inc., Belmont, California.

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CENTRAL WASTE COMPLEX WASTE ANALYSIS PLAN

1.0 UNIT DESCRIPTION

The purpose of this waste analysis plan (WAP) is to document the waste acceptance process, sampling methodologies, analytical techniques, and overall processes that are undertaken for waste accepted for storage and treatment at the Central Waste Complex (CWC), which is located in the 200 West Area of the Hanford Facility, Richland, Washington. For a detailed description of the CWC refer to CWC, Chapter 1.0, "Part A Form", Chapter 2.0, "Facility Description and General Provisions", Chapter 4.0, "Process Information" (DOE/RL-91-17). Activities may be performed by the CWC operating organization or its delegated representative.

1.1 Description of Unit Processes and Activities

The CWC is a nonland-based treatment, storage, and/or disposal (TSD) unit consisting of various buildings, storage modules, storage pad, and a graveled outdoor storage area. The CWC structures are used for the storage and/or treatment of waste and are subject to *Dangerous Waste Regulations*, Washington Administrative Code (WAC) 173-303 and 40 Code of Federal Regulations (CFR) 761.

The CWC consists of the 2401-W, 2402-W, 2403-W, and 2404-W series waste storage buildings, Flammable and Alkali Metal Waste Storage Modules, the Waste Storage Pad, Outdoor Storage Area(s), the waste receiving and staging area, and administrative areas. Additional description can be found in the Chapter 1.0, Chapter 2.0 and Chapter 4.0. Refer to Figures 1-1, 1-2, and 1-3 for additional information on unit processes.

The CWC is designed for storage but can also open, sort, treat, repackage, sample, and physically/chemically screen to characterize retrieved[1] waste; and to verify the characterization of containers of mixed waste and can perform nondestructive examination (NDE) on an as needed basis using portable containment structures. Limited treatment of mixed waste is provided in the 2401-W, 2402-W, 2403-W, and 2404-W series of waste storage buildings within the CWC. Treatment will consist of, deactivation (neutralization, cementing, absorption), stabilization (cementing, absorption, and encapsulation), compaction, and repackaging of waste.

1.1.1 Waste Acceptance, Movement, Processing, and Management

The CWC uses waste tracking processes to ensure that the waste received at the CWC matches the manifest or transfer papers, to ensure that the waste is tracked through the CWC to final disposition, and to maintain the information required in WAC 173-303-380. Waste is tracked through processing such as segregation, repackaging, treatment, and/or intra-TSD unit transfers. The waste tracking process provides a mechanism to track waste through a uniquely identified container (refer to Figure 1-3). The unique identifier is a barcode (or equivalent) that is recorded in an electronic data tracking system. This mechanism encompasses waste acceptance, movement, processing, and management of waste. When a new container is used, identification numbers are assigned and maintained as the waste moves through CWC. The container identification number allows the CWC to link to hard copy or electronic copy of records that are maintained as part of the operating record to retain information on the location, quantity, and physical and chemical characteristics of the waste.

[1] For purposes of this WAP, retrieved waste is suspect mixed waste that was previously stored buried in the LLBG and is being removed for transfer to another TSD unit.

The following sections and Figure 1-1 and Figure 1-2 describe the process for waste acceptance and different types of information and knowledge reviewed/required during the acceptance process. The process for management of waste is described in Chapter 4.0.

1.1.1.1 Narrative Process Descriptions

Waste that meets applicable land disposal restriction (LDR) requirements, as specified WAC 173-303-140, which incorporates by reference 40 CFR 268, is stored at the CWC. Mixed waste that does not meet LDR requirements, as specified in 40 CFR 268 and WAC 173-303-140, is stored until the waste is processed for repackaging or further treatment at the CWC or another approved location. The CWC operating record contains information necessary to meet LDR requirements (Sections 2.1.3.2 and 7.3). Containerized waste that is not fully characterized or is awaiting analytical results can be stored at the CWC as well. The Hanford Facility is required to test certain mixed wastes when treatment standards are expressed as a concentration to ensure that the waste or treatment residues are in compliance with applicable LDR requirements (Section 2.1.3.2 and 7.3). Such testing is performed according to the frequency specified in this WAP, as specified in 40 CFR 268.7(b), incorporated by reference by WAC 173-303-140.

1.1.1.2 Waste Acceptance Process

The waste acceptance process for the CWC consists of following activities:

- Waste Stream Approval. The generator provides information concerning each waste stream on a waste profile sheet. The waste stream information is reviewed against the CWC waste acceptance criteria. If the waste stream information is sufficient and meets the applicable acceptance criteria, the waste stream is approved. In addition, the initial verification frequency for the waste is determined in accordance with the requirements found in the performance evaluation system (PES) program (Section 1.1.1.3). For a more complete description of the waste stream approval process, refer to Section 2.1.1.

- Waste Shipment/Transfer Approval. The generator provides specific data for each waste container on the container data sheet. The container data are reviewed against the waste profile sheet data and the CWC acceptance criteria before being approved for shipment/transfer. In addition, the CWC determines if any of the containers require verification based on the verification frequency as determined by the PES. For a more complete description of the waste shipment/transfer approval process, refer to Section 2.1.2.

- Verification. All waste streams are subject to receipt inspection during the waste shipment acceptance process. The percentage of the waste stream selected for physical and/or chemical screening is determined in accordance with the requirements found in the PES program (Section 1.1.1.3). Containers are opened and verified visually or by NDE. Of those containers subjected to physical screening, a percentage is subject to chemical screening via field or laboratory analysis. All information and data are evaluated to confirm that the waste matches the waste profile and container data/information supplied by the generator.

1.1.1.2.1 Waste Acceptance Process Between Solid Waste Operations Complex TSD Units

Waste transfers between Solid Waste Operations Complex (SWOC) TSD units could be necessary to support Hanford Site goals. In these instances a waste stream profile, or other approved processes that already has been developed, may be used to support these activities. A container may be transferred between SWOC facilities to accommodate the verification activities. A documented review is required to ensure compliance with the CWC waste acceptance criteria. All waste transfers and containers are subject to receipt inspection. For waste that has not been accepted at CWC, LLBG, WRAP, or T Plant Complex TSD units; physical and or chemical screening will be completed as described in Sections 3.1, 3.2, and 3.3. The individual container data, inclusive of all knowledge obtained on the waste is compared to the CWC waste acceptance

requirements. Previously accepted waste that has not been considered for verification will be verified prior to transfer between SWOC TSD units. For a more complete description of the transfer process, refer to Section 2.3.

1.1.1.2.2 Types of Knowledge

When collecting documentation on a waste stream or container, the CWC must determine if the information provided by the generator meets the definition of knowledge in WAC 173-303-040. Knowledge requirements are met by sampling and analysis, and/or process knowledge. Process knowledge consists of detailed information from existing published or documented waste analysis data or studies on processes similar to those that generated the waste, including but not limited to the following:

- Mass balance from a controlled process that has a specified input for a specified output
- Material safety data sheets (MSDSs) on unused chemical products
- Test data from a surrogate sample
- Analytical data on the waste or a waste from a similar process.
- Interview information
- Logbooks
- Procurement records
- Qualified analytical data
- Processes and/or methods
- Process flow charts
- Inventory sheets
- Vendor information
- Mass balance from an uncontrolled process (e.g., spill cleanup)
- Mass balance from a process with variable inputs and outputs (e.g., washing/cleaning methods).

This information will be sufficient to quantify constituents and characteristics to safely manage in compliance with CWC acceptance criteria and WAC 173-303. The CWC acceptance criteria is defined as the requirements found in this WAP and the associated CWC dangerous waste permit application Part A.

1.1.1.3 Description of Performance Evaluation System (PES)

The PES acting as an agent of CWC determines the initial physical screening frequency of each waste stream. PES provides a periodic status of an individual generator's performance for waste received. PES provides a mechanism for determining corrective actions, resolving waste acceptance issues, and physical screening frequency adjustments when a conformance issue has been discovered for newly generated waste.

1.1.1.3.1 Initial Physical Screening Frequency Determination

The initial physical screening frequency is determined based on the following process.

- Personnel responsible for waste receipt at the CWC review the generator waste profile information to determine the relative potential for misdesignation or inappropriate segregation based on all relevant information, including any previous experience with the generator. Based on this review, any concerns are identified associated with the following criteria:
  - documented waste management program
  - waste stream characterization information
  - potential for inappropriate segregation.

- Based on the identification of concerns during the review, an initial physical screening frequency is established for the new generator's waste stream based on the following criteria:

- Initial physical screening frequency of, at a minimum, 20 percent: No concerns identified (e.g., cleanup of contaminated soil where the soil has been well characterized and no other waste generation processes are occurring at that location)
- Initial physical screening frequency of, at a minimum, 50 percent: Concern(s) identified in one criterion
- Initial physical screening frequency of 100 percent: Concerns identified in two or more criteria.

1.1.1.3.2 Performance Evaluation

A performance evaluation is used to trend a generator's waste acceptance performance and is used to adjust the generator's overall physical screening frequency. This evaluation, identified as an integral part of the QA program, is objective and considers the conformance issues documented during the Preshipment Review and Verification functions. The PES maintains processes that: (1) perform evaluations based on conformance issues identified, (2) evaluate unsatisfactory performance for corrective actions, and (3) adjust physical screening rates accordingly.

The performance evaluation is conducted and subsequently accepted by PES team, and the documentation maintained in accordance with Section 8.0. Performance evaluation frequency is based on the generators historical performance and the waste stream in involved.

1.1.1.3.3 Conformance Issue Resolution

Conformance issues could result in a waste container that does not meet the CWC waste acceptance criteria. A conformance issue is any discrepancy identified during the confirmation process with waste package documentation, a waste package, or a shipment. Discrepancies can be identified during preshipment reviews of waste streams during the verification process. If a possible conformance issue is identified, the following actions are taken to resolve the issue.

- The PES compiles all information concerning the possible conformance issue(s).

- The generator is notified and requested to supply additional knowledge that may assist in the resolution of the concern(s). If the generator supplies information that resolves the concern(s) identified, no further action is required.

- On determination that a conformance issue has been identified during verification, the CWC personnel and the generator discuss the conformance issue and identify the appropriate course of action to resolve the container in question, e.g., pick another sample set, return the container, divert the container to another TSD unit that can accept the container and resolve the issue, or the generator resolves the issue at the CWC. If the conformance issue(s) results in a waste stream failure, the physical screening frequency for all waste streams that have the potential to exhibit a similar conformance issue from the generator are adjusted to 100 percent for the next shipment until the issue(s) can be adequately addressed.

- The CWC requests the generator to provide a corrective action plan (CAP) that clearly states the reason for the failure and describes the actions to be completed to prevent recurrence. The generator could request a reduction in verification of unaffected streams. This request must be accompanied by a justification that identifies why this stream(s) would not exhibit the same conformance issue.

- The CWC reviews the CAP and stream justification for adequacy. If the CAP is inadequate, the generator remains at a physical screening rate of 100 percent. If the stream justification is adequate, the CWC could provide an alternative frequency as denoted in Section 1.1.1.3.2.

1.1.1.3.4 Process for Reducing the Physical Screening Frequency

Physical screening (Section 2.2.2) rate frequencies and changes to those frequencies could be applied to a specific waste stream, to a specific contractor, or to a specific offsite generator based on the circumstances surrounding the conformance issue. After the initial physical screening frequency for a given waste stream has been established or increased, the physical screening frequency can be reduced in accordance with the following process.

The physical screening frequency is reduced in three steps. Reduction for all steps is based on the ability to demonstrate that five containers from the waste stream in question pass verification. In addition, reduction to the minimum frequency requires that the CWC documents an acceptable evaluation of the corrective action plan. At no time will the physical screening frequency be reduced below 5 percent for waste generated onsite or below 10 percent for offsite generators.

Step 1) Reduce frequency by up to 66 percent after five containers from the waste stream in question pass verification.

Step 2) Reduce frequency established in Step 1 by up to 50 percent or to the minimum allowable whichever results in a greater frequency after five containers from the waste stream in question pass verification.

Step 3) Reduce frequency established in Step 2 to the minimum allowable after five containers from the waste stream in question pass verification. The CWC documents an acceptable evaluation of the corrective action plan.

The physical screening rate reduction is established during periodic PES team evaluations, and the documentation is maintained according to Section 8.0 of this WAP. The percentage of the reduction is based on the evaluation of the relative severity of the original conformance issue, the status of the corrective action plan, any interim actions taken by the generator, the generator's performance for this waste stream before this reduction, and/or other factors deemed relevant.

1.1.2 Operating Conditions

The CWC shall ensure that all waste management operations are conducted in accordance with design and engineering requirements of waste management structures and equipment, and with all equipment manufacture specifications and operating processes. Before treatment and/or storage of waste, the CWC shall have processes in place to ensure safe management of the waste. These processes shall consider actual or potential risks posed by the waste and treatment and/or storage equipment. The CWC shall conduct all waste treatment and/or storage according to these processes and comply with labeling, container management, and inspection requirements of WAC 173-303-630.

1.2 Identification and Classification of Waste

Dangerous and mixed waste is accepted for storage and/or treatment in the CWC except for the following waste types:

- Bulk liquid waste in tankers
- Bulk solids in trucks or roll-off boxes
- Shock sensitive waste
- Class IV oxidizer waste
- Infectious waste.

Refer to Chapter 4.0 for precautions that are taken when ignitable, reactive, or incompatible waste is stored.

The CWC manages the following waste types:

- Containerized liquids/free liquids
- Pressurized gas cylinders and aerosol cans
- Munitions/explosives (to be evaluated on a case-by-case basis)
- Bulk sodium metal
- Labpack liquids
- Solids/debris
- Sludges/soils.

These waste types could be classified as Waste Retrieval Project (WRP), mixed, and/or dangerous. Unless otherwise prohibited by this WAP, the waste could exhibit the characteristics of ignitable, toxic, corrosive, and/or reactive. In addition to the waste received at the CWC for storage and/or treatment, the CWC generates mixed and dangerous waste. This waste material consists of items such as, but not limited to, personal protective equipment (PPE), rags, and spent equipment contaminated with dangerous cleaning agents, lubricants, paints, or other dangerous materials that designate as dangerous wastes when discarded. Process knowledge, field screening, or sampling and analysis are used as appropriate to characterize these waste materials. Field screening and sampling are in accordance with this WAP and occur at the point of waste generation or at the location where the waste materials are stored.

Biological waste received from generators could consist of animal remains that were used for experiments. This type of waste is analyzed using NDE or visual examination.

1.2.1 Dangerous Waste Numbers, Quantities, and Design Capacity

The CWC Part A identifies dangerous waste numbers, quantities, and design capacity.

Waste is designated pursuant to WAC 173-303 using manufacturer's product information, MSDS, laboratory analysis, and reference material such as *Registry of Toxic Effects of Chemical Substances* (NIOSH). Waste also is characterized in accordance with the requirements of 40 CFR 761.

Designation for Waste Types Reprocessed at CWC:

Number	References
U and P numbers	WAC 173-303-9903-9904
F numbers	WAC 173-303-9904
WPCB	WAC 173-303-9904
D001	WAC 173-303-090(5)
D002	WAC 173-303-090(6)
D003	WAC 173-303-090(7)
D004 through D043	WAC 173-303-090(8)
WT01 and WT02	WAC 173-303-100 and 104
WP01, WP02, and WP03	WAC 173-303-100 and 104
WSC2	WAC 173-303-090(6)/104

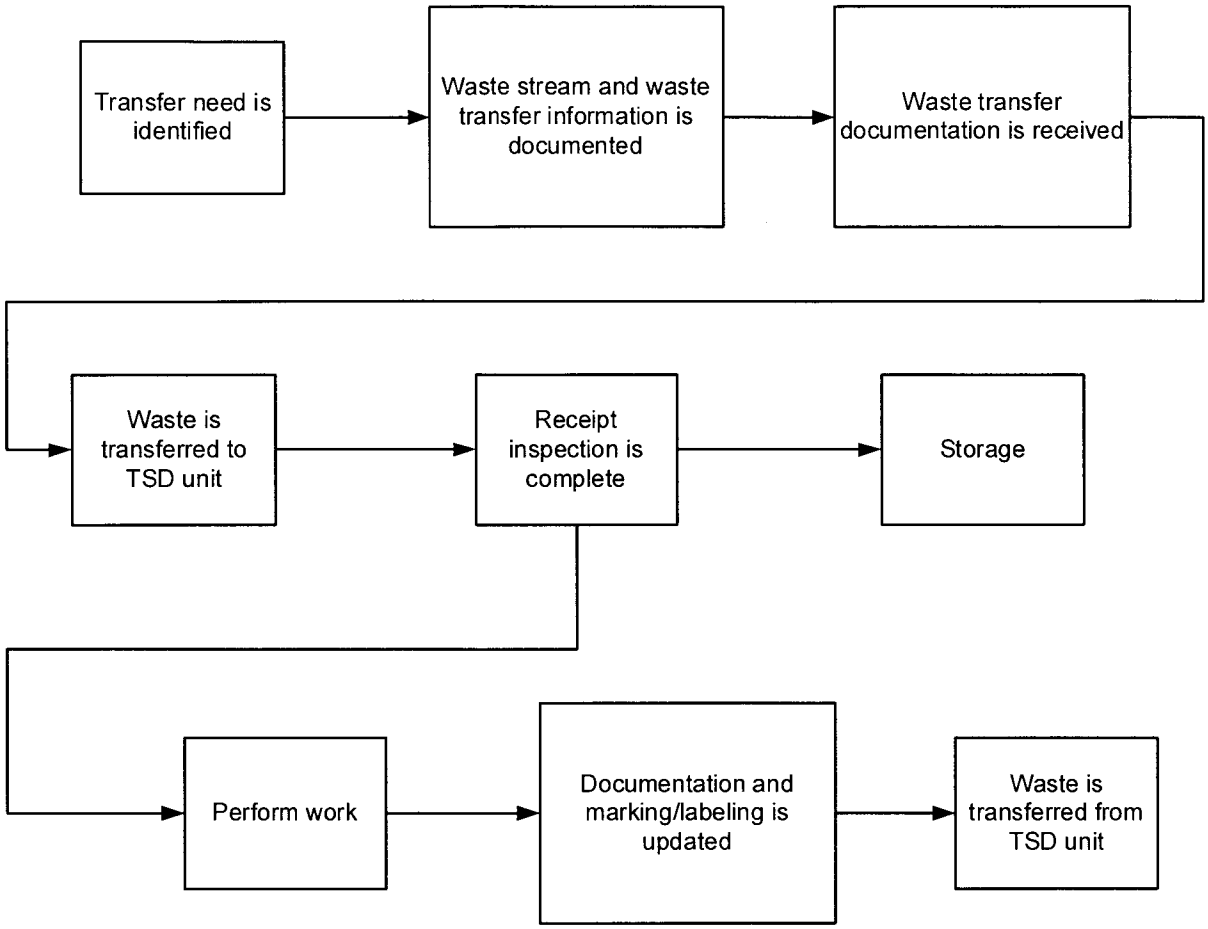

Figure 1-1. Waste Transfers Between Solid Waste Operations Complex TSD Units.

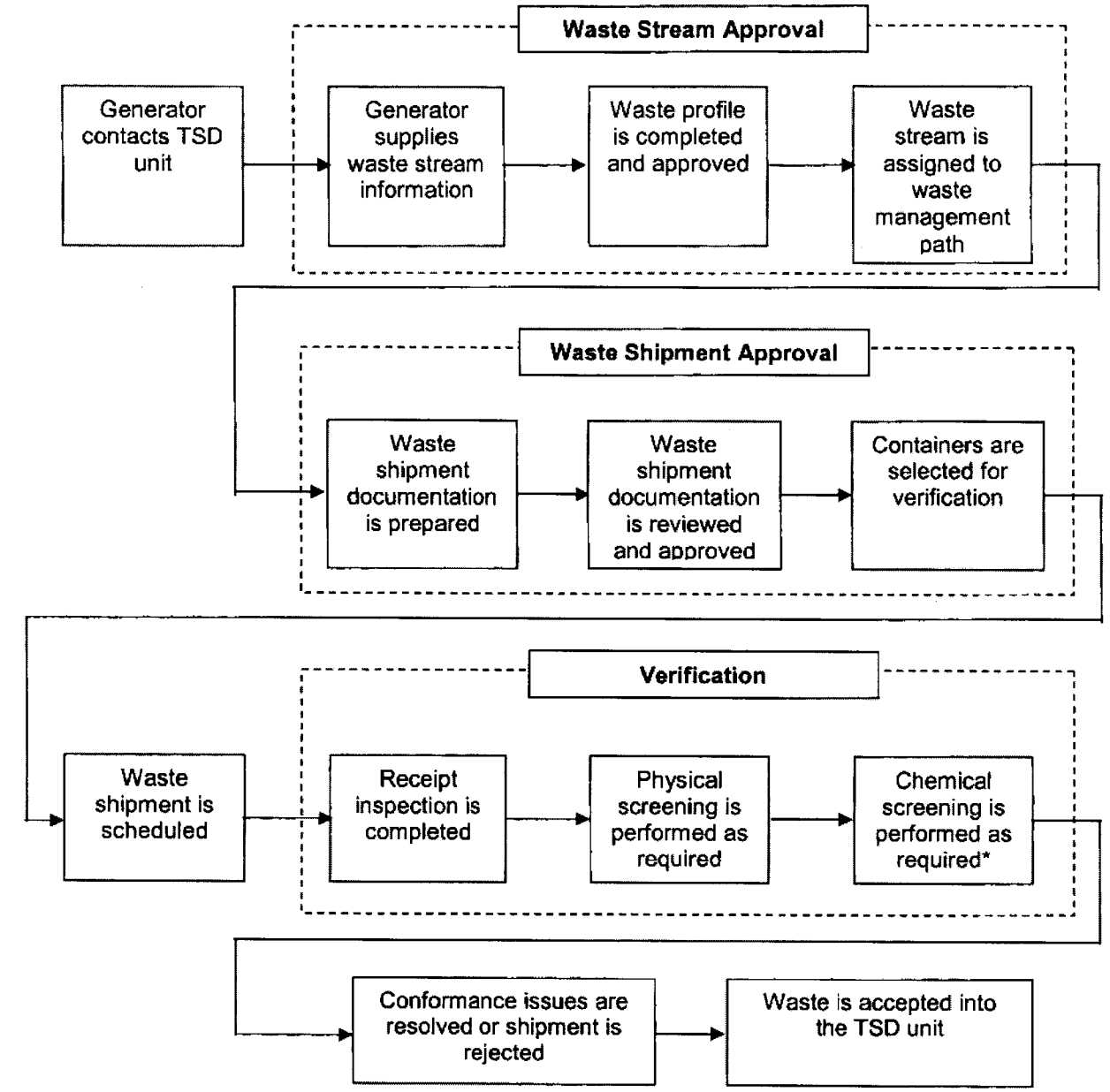

Figure 1-2. Waste Confirmation and Acceptance Process for Newly Generated Waste.

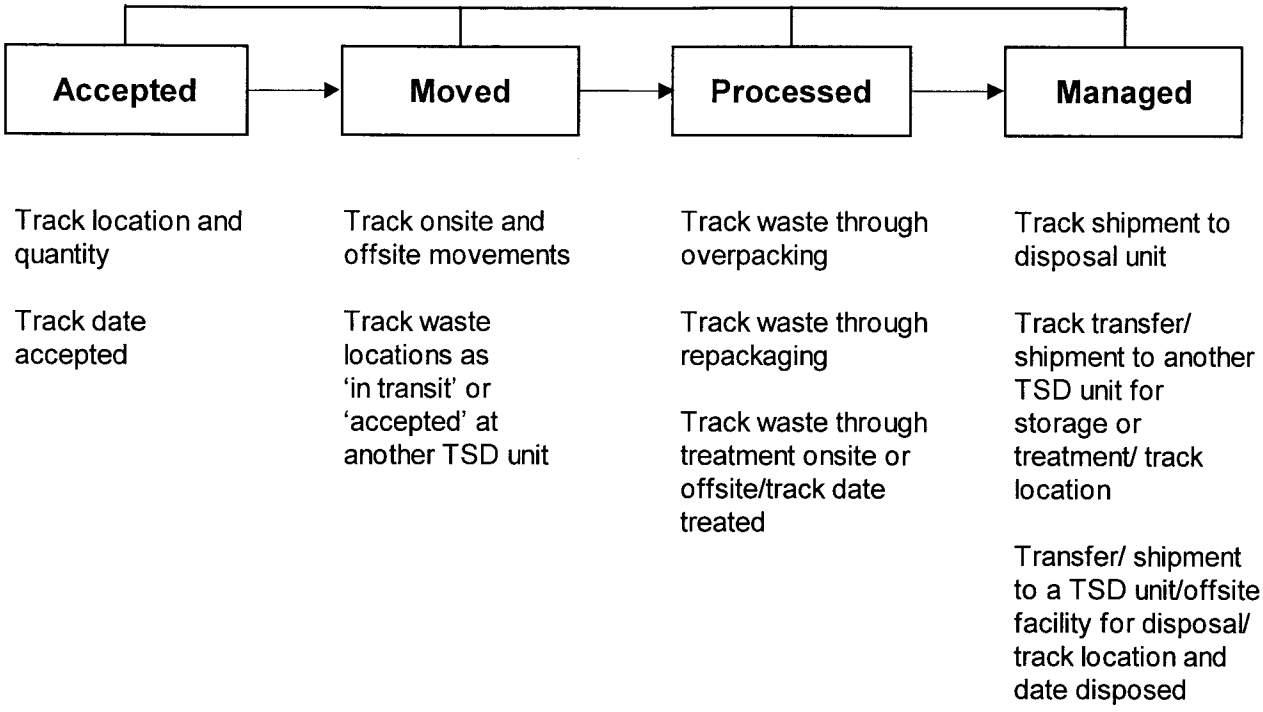

Figure 1-3. Waste Tracking.

2.0 CONFIRMATION PROCESS

The confirmation process used to meet WAC 173-303-300 requirements includes completing appropriate pre-shipment reviews and verification steps and/or parameters as described in this section and indicated on Figure 2-1. The confirmation process for onsite generators and offsite generators is detailed in Section 2.1 and 2.2 for SWOC-generated waste is detailed in Section 2.8, WRP waste is detailed in Section 2.7 and for CWC-generated waste is detailed in Section 2.8.

2.1 Pre-Shipment Review

Pre-shipment review takes place before waste can be scheduled for transfer or shipment to CWC. The review focuses on whether the waste stream is defined accurately, meets the CWC waste acceptance criteria, and the LDR status is determined correctly (for mixed waste subject to LDR treatment standards refer to Section 7.3.1). Only waste determined to be acceptable for storage and/or treatment is scheduled. This determination is based on the information provided by the generator. The pre-shipment review consists of the waste stream approval and waste shipment approval process. The following sections discuss the pre-shipment review process. The information obtained from the generator during the pre-shipment review, at a minimum, includes all information necessary to safely store and/or treat the waste. The pre-shipment review ensures the waste has been characterized for purposes of evaluation against the CWC waste acceptance criteria, and that the data provided qualify as 'knowledge' (Section 2.1.3).

2.1.1 Waste Stream Approval Process

The waste stream approval process consists of reviewing waste stream information supplied on a waste stream profile or other approved processes and attached analysis. At a minimum, the waste stream profile or other approved processes requests the following information:

- Generator information (e.g., name, address, point-of-contact, telephone number)
- Waste stream name
- Waste generating process description
- Chemical characterization information (e.g., characterization method(s), chemicals present, concentration ranges)
- Designation information
- For mixed and dangerous waste (WRP waste is excluded) LDR information including identification of underlying hazardous constituents (UHCs) if applicable
- Waste type information (e.g., physical state, absorbents used, inert materials, stabilizing agents used)
- Packaging information (e.g., container type, maximum weight, size)
- Attachments could consist of container drawings, process flow information, analytical data, etc.

This information is reviewed against the CWC waste acceptance criteria to ensure the waste is acceptable for receipt. If conformance issues are found during this review, additional information is requested that could include analytical data or a sample to be analyzed. If the waste cannot be received, the CWC will pursue

acceptance of the waste at an alternative TSD unit or request the generator to pursue acceptance at an offsite facility or another approved facility.

On determination that the waste is acceptable for receipt at the CWC, the CWC assigns the waste on the profile or other approved processes to a waste management path and establishes a waste verification frequency based on the PES requirements found in Sections 1.1.1.3 and 2.2.3.1.

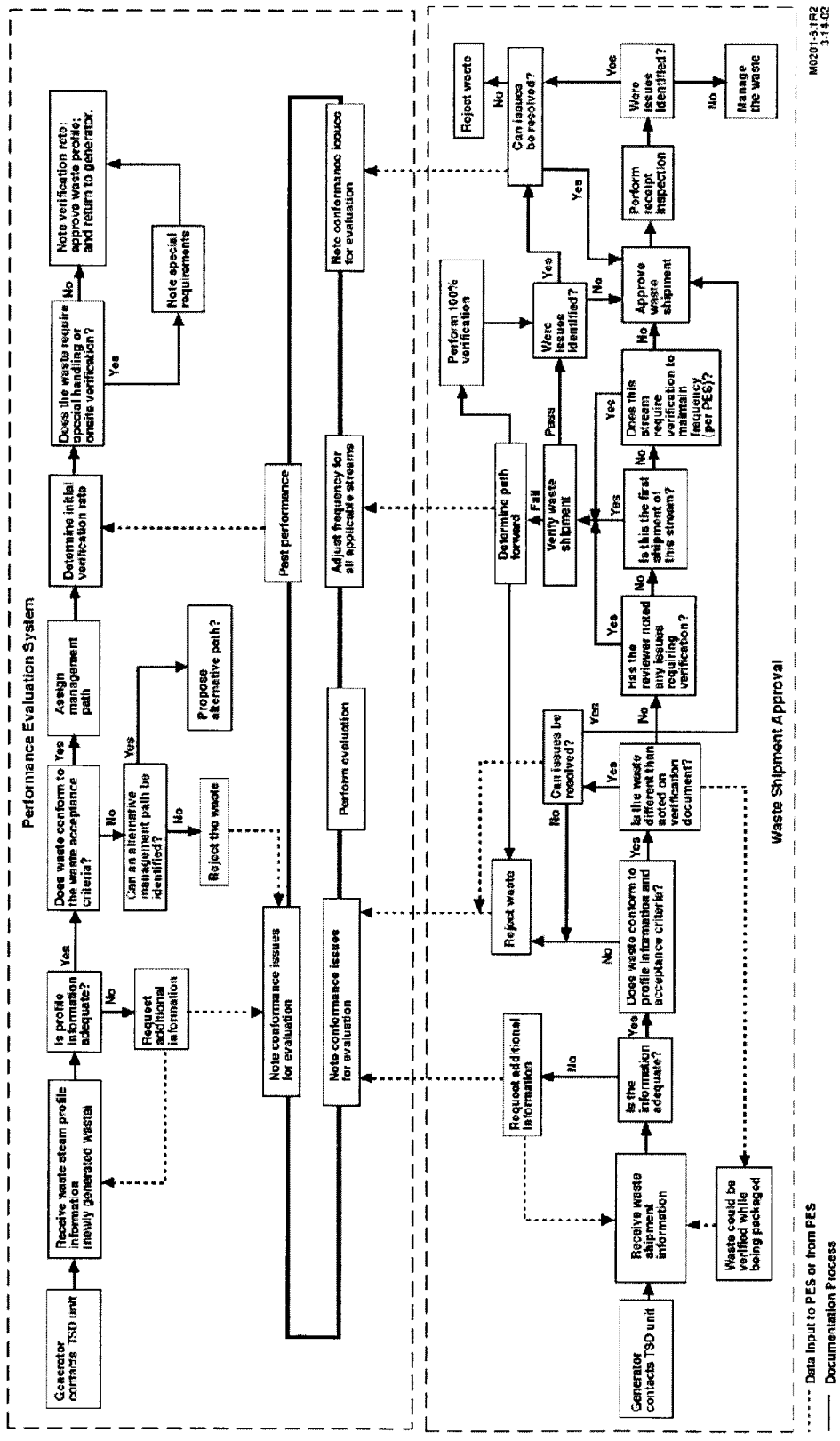

Figure 2-1. Waste Acceptance Process.

2.1.2 Waste Shipment Approval Process

For each waste transfer or shipment that is a candidate for storage and/or treatment, the generator provides the following information:

- Container identification number
- Profile number or other approved processes (except for waste transfers of previously accepted waste)
- Waste description
- Generator information (e.g., name, address, point-of-contact, telephone number)
- Container information (e.g., type, size, weight)
- Waste numbers
- Designation as extremely hazardous waste or dangerous waste
- Waste composition
- Packaging materials and quantities.

The pertinent information is entered into a solid waste information tracking system.

Where potential conformance issues exist in the information provided, (e.g., waste characteristics do not match the waste profile information, CWC waste acceptance criteria, or additional constituents are expected to be present that do not appear on the documentation), the generator is contacted (if available) by the CWC for resolution. Refer to Section 6.0 for discussion on repeat and review frequency.

For each container, a technical review is performed. WRP waste containers will follow an approved process (Section 2.7). Other reviews such as physical screening determination and chemical screening determination are defined in Section 2.2.2 and 2.2.3. Technical review is as follows:

- **Technical review.** The individual container data are compared to the waste profile or other approved process data to ensure the waste to be shipped to the CWC is as described by the waste profile. Every transfer is reviewed to ensure the waste meets the CWC waste acceptance criteria.

  Based on waste identification information provided, the waste designation is reviewed to ensure compliance with waste designations per WAC 173-303-070 through -100, as well as evaluating whether the waste meets the CWC waste acceptance criteria.

  If the transfer or shipment information is found to be acceptable, the CWC determines if any of the waste containers will be physically or chemically screened. WRP waste will be physically and/or chemically screened as determined by the WRP Program.

2.1.3 Knowledge Requirements

The CWC ensures that all information used to make waste management decisions will be based on the requirements found in the following sections. Information determined to be 'knowledge' must meet the definition of 'knowledge' provided by WAC 173-303-040.

2.1.3.1 General Knowledge Requirements

Adequate knowledge requires (1) general waste knowledge requirements, (2) LDR waste knowledge requirements, and/or (3) waste knowledge exceptions.

(1) **General Waste Knowledge Requirements for Designation and Waste Management**. At a minimum, the generator supplies enough information for the waste to be treated and/or stored at CWC. The minimum level of knowledge consists of designation data where the constituents or knowledge of the

waste's generating source (in the case of wastes potentially from listed sources) causing a dangerous waste number to be assigned are quantified, and that data addresses any CWC operational parameters necessary for proper management of the waste.

When process knowledge indicates that constituents, which if present in the waste might cause the waste to be regulated, are input to a process but not expected to be in the waste, sampling and analysis can be performed to ensure the constituents do not appear in the waste above applicable regulatory levels. This requirement can be met through chemical screening. This sampling and analysis is required only for initial characterization of the waste stream.

When the available information does not qualify as knowledge or is not sufficient to characterize a waste for management, the sampling and testing methods outlined in WAC 173-303-110 are used to determine whether a waste designates as ignitable, corrosive, reactive, and/or toxic, and the sampling and testing methods will be used as applicable to determine whether the waste contains free liquids. If the analysis is performed to complete characterization after acceptance of the waste by the CWC, then this WAP governs the sampling and testing requirements.

(2) **Waste Knowledge Requirements for LDR Compliance.** Waste is stored at the CWC while awaiting analytical results for LDR requirements. The CWC portion of the operating record contains all information required to document that the appropriate treatment standards have been met or the treatment required to meet the LDR treatment standards, unless otherwise specified in this section.

For the purposes of this WAP, a representative sample is required to demonstrate compliance with a concentration-based treatment standard (refer to Section 4.0). Corroborative testing for the sample could be accomplished in the following manner.

- Generators could use onsite laboratories or other laboratories to obtain data that could be used as basis to certify that the waste meets concentration-based LDR treatment standards. For waste that must meet method based LDR treatment standards, information must be supplied on the treatment methods necessary to meet LDR requirements and comply with WAC 173-303-380(1)(j),-(k),-(n), and -(o).

- The CWC uses these analytical data to meet applicable requirements found in WAC 173-303-140(4).

(3) **Waste Knowledge Exceptions.** The CWC is designed to provide information necessary to further disposition the waste (e.g., repackage, designate, segregate, sample, and analyze). The CWC shall ensure sufficient information is available (D001, D002, D003, and incompatibility) and operation safeguards are in place to safely process waste. If sufficient information is not available, the waste will enter the discrepant container management process described in Section 2.5 in order to obtain the necessary information.

2.1.3.2 Methodology to Ensure Compliance with Land Disposal Restrictions Requirements for Mixed and Dangerous Waste

All generators of mixed and dangerous waste are subject to LDR requirements and are required to submit all information notifications and certifications described in WAC 173-303-380(1)(j),-(k),-(n), and -(o). Mixed and dangerous waste not meeting the treatment standards, but meeting the CWC waste acceptance criteria, can be stored at the CWC (refer to Section 1.1.1.1). The following are general requirements for offsite notifications or onsite information and supporting documentation.

- The waste is subject to LDR and the generator has treated the waste. The generator supplies the appropriate LDR certification information (WAC 173-303-140).

- The waste is subject to LDR and the generator has determined that the waste meets the LDR for disposal. The generator develops the certification based on process knowledge and/or analytical data and supplies the appropriate LDR certification information necessary to demonstrate compliance with the LDR treatment standards of WAC 173-303-140. State-only LDRs do not require this type of certification.

- The waste is subject to LDR and requires further treatment to meet applicable treatment standard.
  - The generator supplies additional information concerning the waste and details any treatment necessary to meet applicable treatment standards.
  - If waste is treated to meet state-only or federal LDRs at the CWC, the CWC prepares information necessary to meet WAC 173-303-380(1)(k) (refer to Section 7.3).

A representative sample of the waste must be submitted for analysis to ensure that concentration-based LDR treatment standards are met. This sample could be taken by the CWC or the generator, and is required to comply with the treatment standards contained in 40 CFR 268.40 and 268.48 for UHCs.

2.2 Verification

Verification is an assessment performed by the CWC to substantiate that the waste stream received at the CWC is the same as represented by the analysis supplied by the generator for the pre-shipment review. Verification is performed on waste received by the CWC. Verification includes container receipt and inspection. In addition, select containers could be subject to physical screening, and chemical screening. Waste is not accepted by the CWC for storage and/or treatment until the required elements of verification have been completed, including evaluation of any data obtained from verification activities. Documentation reviewed as part of verification activities could include manifest or onsite shipment document, container inventory documentation, a container listing report, visual verification records, screening analyses, and the waste profile.

All conformance issues identified during the verification process are resolved in accordance with Section 1.1.1.3.3.

Containers previously used to hold non-acute dangerous waste will be evaluated to determine if they are empty by using the following criteria: A container or inner liner is "empty" when all wastes in it have been taken out that can be removed using practices commonly employed to remove materials from that type of container or inner liner (e.g., pouring, pumping, aspirating, etc.) and, no more than one inch of waste remains at the bottom of the container or inner liner, or the volume of waste remaining in the container or inner liner is equal to three percent or less of the container's total capacity, or, if the container's total capacity is greater than one hundred ten gallons, the volume of waste remaining in the container or inner liner is no more than 0.3 percent of the container's total capacity.

The presence of free liquids which readily separate from the solid waste portion of dangerous waste may be determined by either the paint filter test or through NDE results.

2.2.1 Container Receipt Inspection

Container receipt inspection is a mandatory element of the verification process. Therefore, 100 percent of each shipment (including onsite transfers) is inspected at the CWC for possible damage or leaks, complete labeling, and if present, tamper-resistant seals are intact (Sections 2.2.2 and 2.2.3). This is to ensure that the shipment: (1) is received at the CWC in good condition, (2) is the waste indicated on the transfer or shipping papers, (3) has not been opened after physical and/or chemical screening was performed, and (4) is complete. When a conformance issue exists, a case-by-case determination is performed and the appropriate action is

taken based on the severity of the issue. One of the following actions may be taken as appropriate, in response to a conformance issue:

- Implementation of the contingency plan (DOE/RL-94-02) per the *Building Emergency Plan for Central Waste Complex* (HNF-IP-0263-CWC).

- Conformance issues where additional information is needed to safely manage the waste are resolved before verification continues.

- Continuation of verification for waste with conformance issues not meeting the above criteria.

2.2.2 Physical Screening Process

Physical screening is used as a verification element. This section describes the requirement pertaining to methods, frequency, and exceptions concerning the use of physical screening as a verification activity. Physical screening could be performed before the waste is shipped to the CWC. When physical screening is performed at a location not within the SWOC TSD units, tamper-resistant seals are applied to each container when examined. Upon receipt at the CWC, tamper-resistant seals are verified as intact to ensure that no changes could have occurred to the waste content. The requirements for adding and/or removing tamper-resistant seals are maintained through an established program. Documentation shall be maintained in the CWC operating record.

Selection and interpretation of the appropriate physical screening method(s) are conducted by personnel who are trained as required by the *CWC Dangerous Waste Training Plan* (HNF-1273). Each physical screening method is performed by trained personnel according to *CWC Dangerous Waste Training Plan* (HNF-1273).

2.2.2.1 Physical and Chemical Screening Determination

Processes must be maintained describing the activities for selecting containers for physical/chemical screening. Authoritative/directive means of selecting containers for physical/chemical screening are used based on the pre-shipment and/or waste stream review process. The selection is based on the contents listed in the associated shipment/waste stream documentation, the variation within and experience with the specific waste type.

Two criteria are used in making the selection. The first criterion is based on whether pre-shipment review activities (document and characterization review) identify areas of potential concern. The second criterion is reviewing the current physical screening percentage (calculated according to Section 2.2.2.3) of containers offered for receipt from said waste stream from said generator that have been offered over the past 12 months or the date of the last physical screening adjustment, whichever occurs last. The rate will be applied as compared to those that have been physically screened. This criterion ensures that the minimum physical screening rates required by this WAP are met.

The number of containers selected for physical screening per waste stream is determined by comparing the calculated percentage rate which is then adjusted according to the PES. This selected group of containers constitutes a sample set.

On determining whether the waste container(s) will be verified, the container(s) is scheduled for shipment.

2.2.2.2 Physical Screening Methods

The following physical screening methods, comply with the requirement to verify a waste.

1. Visual inspection (opening the container)
2. NDE.

Refer to Section 2.2.5 for QC pertaining to physical screening. (Refer to Section 3.1 for the criteria and rationale for choosing a physical screening method.)

Waste packaging that is witnessed by the CWC or its representative at a non-SWOC location is considered to have met the physical screening requirements denoted in this WAP, provided that the program meets the requirements of WAC 173-303 and the witness is qualified to determine the waste meets acceptance requirements. On closure of the container, tamper-resistant seals must be applied to ensure the integrity of the contents.

2.2.2.3 Physical Screening Frequency

The minimum physical screening frequency is 5 percent for onsite generators, applied per waste stream per generator per year. For offsite generators, the minimum physical screening frequency is 10 percent per waste stream per generator per year. The CWC adjusts the physical screening frequency for generators based on objective performance criteria (refer to Section 1.1.1.3.1).

If a container fails verification, the waste stream physical screening frequency will be raised to 100 percent with the next containers offered. Subsequent containers offered will be evaluated through the PES for verification rates, as described in Section 1.1.1.3 of this WAP.

2.2.2.4 Physical Screening Exceptions

The following are exceptions to the physical screening process outlined previously.

- Shielded, classified, and remote-handled mixed waste are not required to be physically screened; however, the CWC performs a more rigorous documentation review and obtains the raw data used to characterize the waste (less than 1 percent of current waste receipts). For classified waste, it is necessary to have an appropriate U.S. Department of Energy security clearance and a need to know the information as defined by the classifying organization or agency.

- Waste that physically cannot be screened at the CWC or an associated screening facility must be physically screened at the generator location [e.g., large components, containers that can not be opened, for as low as reasonably achievable (ALARA) purposes, or does not fit into a NDE unit]. Physical screening at the generator location consists of observing the packaging of the waste. If no location can be found to perform the physical screening, no screening is required.

- Waste that is packaged by a trained CWC-delegated representative(s) is considered to have met the physical screening requirements as denoted within this WAP.

- Waste that has been packaged and physically screened at a SWOC TSD unit.

2.2.3 Chemical Screening Process

Chemical screening is used as a verification element. This section describes methods, frequency, and exceptions for chemical screening. Chemical screening could be performed before the waste is shipped to the CWC. When screening is performed at a location not within the SWOC TSD units, tamper-resistant seals are applied to each container examined and, on receipt at CWC, verified as acceptable to ensure that no changes could have occurred to the waste content. Processes are maintained by the CWC detailing the requirements

for adding and/or removing tamper-resistant seals. Documentation shall be maintained in the CWC operating record.

Qualified personnel conduct selection and interpretation of chemical screening methods. Unless otherwise noted, tests are qualitative, not quantitative. The objective of screening is to obtain reasonable assurance that the waste generally consistent with the description on the shipping documentation. The following tests are selected depending on the waste matrix and the applicability of the method.

- pH
- Peroxide
- Oxidizer
- Water reactivity
- HOC (chlor-n-oil/water/soil)
- Headspace
- Sulfide
- Cyanide
- Paint filter.

Refer to Section 2.2.5 for QC information for chemical screening. Processes are maintained by the CWC that define the basis for selecting screening tests.

2.2.3.1 Chemical Screening Frequency

At a minimum, 10 percent of the mixed or dangerous waste containers verified by physical screening (Section 2.2.2) must be screened chemically. CWC obtains a representative sample, which could be a grab sample.

Small containers of waste (labpacks), not otherwise identified in the exceptions and packaged in accordance with 40 CFR 264.316, 40 CFR 265.316, and WAC 173-303-161 are screened chemically in accordance with the chemical screening frequency of the waste stream as determined by the PES team (Section 1.1.1.3). Inner containers are segregated by physical appearance. At least one container from each group (or three containers if all are similar) are screened chemically.

2.2.3.2 Chemical Screening Exceptions

The following are cases in which chemical screening is not required.

- Small containers of waste in overpacked containers (labpacks) packaged in accordance with WAC 173 303-161 and not prohibited under LDR specified in WAC 173-303-140

- Waste exempted from the physical screening requirements (Section 2.2.2.4)

- Commercial chemical products in the original product container(s) (e.g., off-specification, outdated, or unused products)

- Chemical containing equipment removed from service, (e.g., ballasts, batteries)

- Waste containing asbestos

- Waste, environmental media, and/or debris from the cleanup of spills or release of single substance or commercial product or otherwise known material (e.g., material for which an MSDS can be provided)

- Confirmed noninfectious waste (e.g., xylene, acetone, ethyl alcohol, isopropyl alcohol) generated from laboratory tissue preparation, slide staining, or fixing processes

- Hazardous debris as defined in WAC 173-303-040

- Other special cases could be exempted on a case-by-case basis.

2.2.4 Sampling for Confirmation Screening

Sampling is performed in accordance with WAC 173-303-110(2). A representative sample is obtained for chemical screening. The chemical screening methods described in Section3.0 do not require any sample preservation methods because the screening tests are performed at the time and location of sampling, or as soon as possible thereafter. During the interim period, the samples are stored in a manner that maintains chain of custody and protects the sample composition.

2.2.5 Quality Assurance and Quality Control for Confirmation Process

The following QA and QC elements are used by the CWC to ensure confirmation activities provide sufficient data to provide an indication that waste received is as described in the shipping documentation. Physical/chemical screening methods shall have sufficient performance levels to yield valid decisions when considering method variability (precision and accuracy). Data quality objectives have been established with Washington State Department of Ecology (Ecology) in accordance with TPA Action Plan Section 6.5 (Ecology et al. 2003) and have been documented and reflected in this WAP. In addition, all screening equipment requiring calibrations shall be checked before use to ensure calibration dates are current and equipment is functioning properly. This check will be documented in equipment log books. Personnel performing screening activities are properly trained and current certifications are on record. During screening activities strict compliance with applicable industrial hygiene and safety standards is mandatory.

2.2.5.1 Physical Screening Quality Control

This section describes the QC used by CWC to ensure that quality data are obtained when performing physical screening methods identified in Section 2.2.2, except visual inspection. Physical screening QC is used only to ensure that quality data are obtained when performing NDE. Visual inspection does not consist of the use of instrumentation or chemical tests. QC objectives for visual inspection are obtained through the appropriate training.

The following QC elements apply to NDE used for physical screening:

- A penetration test is performed when image data generating components are changed to document system capability has not changed.

- A resolution test is performed at the beginning of a shift. A shift ends when shutdown activities are performed. A shift can be up to 24-hours.

- A radiographer is qualified per SNT-TC-IA, Level II certification of American Society of Nondestructive Testing training.

- Examination must cover 100 percent of the waste in the container.

- At minimum annually, a capability demonstration is performed on a training drum.

2.2.5.2 Chemical Screening Quality Control

The following QC elements are used when performing chemical screening.

- Appropriate sample containers and equipment are used.
  - Containers and equipment of the appropriate size that are chemically compatible with the waste and testing reagents shall be used.

- Reagent checks
  - Water that is reagent grade and from a documented source shall be used.
  - Chemicals and test kits must be labeled so that these are traceable and documented in the CWC operating record.
  - QC checks shall be performed on each lot of test kit and associated reagents and documented in the CWC operating record, unless a more frequent period is specified in the test kit instructions.
  - Personnel performing chemical screening are adequately trained and current qualifications/certifications are on record.

2.3 Waste Transfers Between Solid Waste Operations Complex TSD Units

Transfers from the SWOC TSD units to the CWC may be necessary to perform verification, obtain additional knowledge to support treatment/disposal, to make the waste amenable for long-term storage, or to perform treatment. A technical review is required to ensure compliance with the CWC waste acceptance criteria. For waste that is being transferred from the SWOC TSD units TSD units to the CWC, the following requirements apply.

2.3.1 Waste Stream Approval Process

The waste stream must already have been approved using the process described in Section 2.1.1. Waste knowledge exceptions apply as described in Section 2.1.3.1.

For retrieval of suspect-mixed waste streams from the LLBG, sufficient information must be available to further disposition the waste. Mixed waste containers are transferred out of the LLBG to CWC or another TSD unit and ultimately received at WRAP or another approved TSD unit for packaging and/or treatment. The amount and type of data that exists for a given waste package vary widely and depend on the documentation requirements in effect when the waste was generated. The SWOC TSD unit is required to supply specific information about the waste package contents. A technical review of the records is performed as described in Section 2.3.2 and suspect dangerous waste items are identified. Suspect mixed or dangerous waste will be evaluated and managed for safe storage until a waste designation can be completed. Additionally, a visual inspection is performed on the containers before transfer.

2.3.2 Waste Transfer Approval Process

A technical review of documentation associated with each waste container in the shipment is performed to ensure the waste meets the CWC waste acceptance criteria. The individual container data, inclusive of all knowledge obtained on the container is compared to the CWC's waste acceptance requirements. If necessary, the waste management path (waste specification record) previously assigned to the waste stream is updated and re-labeling/remarking is completed before the transfer. Waste is tracked through processing at the CWC in accordance with Section 1.1.1. When characteristics of the waste change as a result of treatment or other processing, documentation will be entered into the unit-specific operating record. As new information is obtained on the waste, the container is managed to any new requirements. Updates to container data during transfer and subsequent processing activities are reflected in solid waste information tracking system, documented, and maintained in accordance with Section 8.0.

2.3.3 Verification

For container receipt inspection, 100 percent of each transfer is inspected for damage and to ensure the waste containers are those indicated on the documentation. This activity is a mechanism for identifying any document conformance issues or damaged containers before receipt/acceptance. Conformance issues identified during receipt are managed as described in Section 2.2.1.

For physical/chemical screening, once waste has been verified, additional physical/chemical screening is not required.

2.3.4 Performance Evaluation System

The performance of the generator is evaluated and documented in accordance with the PES as described in Section 1.1.1.3. The PES is used to determine physical screening frequency and determine corrective actions for conformance issues. The performance evaluation considers all newly-generated waste accepted at SWOC TSD units.

2.4 Waste Acceptance

Initial acceptance of waste occurs only after the confirmation process described in Section 3.2.0 is complete. Conformance issues identified during the confirmation process are documented and managed in accordance with Section 1.1.1.3.3. Conformance issues that must be corrected before waste acceptance include:

- Waste does not match approved profile documentation,
- Designation, physical, and/or chemical characterization discrepancy,
- Incorrect LDR paperwork,
- Packaging discrepancy,
- Manifest discrepancies as described in WAC 173-303-370(4)(a) [for offsite shipments unless Permit Conditions II.P.2 can be utilized (Ecology 2004)].

Waste that does not meet the CWC waste acceptance criteria can be accepted when that waste is scheduled for discrepancy resolution. The discrepancy resolution activities will be tracked to completion (refer to Section 2.5).

2.5 Discrepant Container Management

During the waste acceptance process at the CWC or another SWOC TSD unit (e.g., T Plant, WRAP, or LLBG), an issue can arise where a container will be identified with a discrepant item(s) and will be called a 'discrepant container.' When a discrepant container is identified that would affect the management of the container, the following processes will be initiated:

- Liquids discovered in nonempty containers will be placed in secondary containment that meets the requirements of WAC 173-303-630(7)(a). For combination packages[2], if the liquids are only present within inner containers and no free liquids are present in the outer container, the external container will serve as secondary containment, provided that the combination package can be managed in a manner that meets the requirements of WAC 173-303-630(7)(a) and the compatibility requirements in WAC 173-303-395(1).

[2] A combination package is any configuration where dangerous and/or mixed wastes are confined within (inner) containers, which are in turn stored within secondary, external (outer) containers. Examples include labpacks, certain overpacks, portable spill pallets, or any container configuration that has an outer container with one or more inner containers.

- Liquids discovered in nonempty containers of waste destined for disposal at the offsite disposal facility pursuant to the Land Withdrawal Act will be managed according to Section 2.7.5.
- An evaluation will be performed to ensure the compatibility with the other materials in the container and with the outer container in accordance with WAC 173-303-395(1)(b) and will be documented in accordance with WAC 173-303-395(1)(c). Liquids not determined to be compatible with the waste contents or the container will be segregated and placed on separate spill containment.
- If adequate information is unavailable to determine the liquids constitute an imminent hazard, the container will be segregated and placed on separate spill containment and placed as a priority for discrepancy resolution.
- For waste where the generator can be contacted, the generator will be requested to provide additional information. The container will be dispositioned by either returning it to the generator (provided it can be transported safely and compliantly) or by resolving the discrepancy on the container at a SWOC TSD unit.
- For project waste an evaluation will be performed on available historical data. In addition, interviews could be performed with project points-of-contact, NDE personnel, etc.
- Based upon the evaluation of information (hazards identified) the container will be managed in a safe configuration.
- The container will be scheduled for discrepancy resolution.

2.6 Sampling and Analysis Plans

A sampling and analysis plan (SAP) can be developed outside the WAP to support characterization of waste for various projects. A SAP will provide sufficient detail to ensure that sampling personnel and the analytical laboratory correctly implement the data quality objectives (DQOs) and quality assurance project plan requirements pursuant to TPA Action Plan Section 6.5 (Ecology et al. 2003). Sampling and analysis plans can utilize existing process knowledge and/or analytical data in combination with sampling requirements as identified in the SAP to sufficiently characterize a waste stream for acceptance into a SWOC unit.

2.7 Management of Waste Retrieval Project Waste within Solid Waste Operations Complex TSD Units

The WRP waste has an approved process for the management of waste. Requirements for the development of knowledge documentation for waste streams are part of the process. This WAP does not reiterate the documentation process. Instead, this WAP describes how specific aspects of the documentation process are applied. WRP waste will be managed and processed through SWOC TSD units to make ready for shipment.

The SWOC TSD unit WAPs dictate minimum requirements for waste acceptance. The types of information that can be used for physical/chemical characterization include data from analysis of the waste and knowledge of the materials and/or processes that generate the waste. If the information is sufficient to quantify constituents and characteristics as required by CWC waste acceptance criteria and meets the definition of 'knowledge' in WAC 173-303-040, the information is considered sufficient.

Waste knowledge must be sufficient to determine the waste stream designation and manage the waste in accordance with CWC-specific waste acceptance criteria necessary for proper management. This includes, but is not limited to, sufficient knowledge to demonstrate that the waste is not prohibited from management, to segregate waste containers for compatibility, to ensure compatibility of waste within containers, to ensure that the waste can be safely managed, and to segregate waste for treatment, storage and/or disposal. The minimum level of knowledge consists of designation data where the constituents causing a dangerous waste code to be assigned are quantified. This data provides knowledge that addresses any operational parameters necessary for proper management of the waste. When process knowledge indicates constituents are present that cause

the waste to be regulated, applicable waste codes are then applied. Characterization can consist of chemical screening and/or sampling as appropriate.

Analytical data and/or knowledge of the waste must be sufficient to determine whether the waste is regulated under 40 CFR 761 and/or WAC 173-303, and to assign correct waste codes. Knowledge must be sufficient to reliably substitute for direct testing of the waste. Knowledge of the waste generating process alone is used to determine whether a waste stream is a listed waste identified in WAC 173-303-080 through WAC 173-303-082. For other waste numbers and for classification under 40 CFR 761, if the available process knowledge is not sufficient to determine whether the waste is regulated and to assign waste numbers, analysis of a representative sample can be performed. The sampling and testing methods outlined in WAC 173-303-110 or other approved methods must be used for the toxicity characteristics, corrosivity, and free liquids. For other characteristic and state criteria designations, when testing is needed, an appropriate method must be used. Appropriate test methods can include SW-846 or test methods which meet or exceed the quality assurance and quality control limits as written in the latest version of SW-846. The test method must be able to meet detection and quantitation limits which are below required regulatory action limits.

Pre-shipment review takes place before waste can be scheduled for transfer or shipment to CWC. The review focuses on whether the waste stream is defined accurately, meets the CWC waste acceptance criteria, and the LDR status for mixed and dangerous waste (for WRP waste refer to Section 2.7) is determined correctly. Only waste determined to be acceptable for treatment and/or storage is scheduled. This determination is based on the information provided by the generator. The pre-shipment review consists of the waste stream approval and waste shipment approval process. The following sections discuss the pre-shipment review process. The pre-shipment review ensures the waste has been characterized and the data provided qualify as 'knowledge' (refer to Section 2.1.3).

2.7.1 Waste Stream Approval Process for WRP Waste

The waste stream approval process consists of reviewing stream information supplied on a knowledge document and attached analysis (if available). At a minimum, the knowledge documentation or other approved processes requests the following information:

- Generator information (e.g., name, address, point-of-contact, telephone number)
- Waste stream name
- Waste generating process description
- Chemical characterization information (e.g., characterization method(s), chemicals present, concentration ranges)
- Designation information
- Waste type information (e.g., physical state, absorbents used, inert materials, stabilizing agents used)
- Packaging information (e.g., container type, maximum weight, size)
- Attachments could consist of container drawings, process flow information, analytical data, etc.

This information is developed on a waste stream basis and applied to individual containers prior to transfer. If conformance issues are found during this review, additional information is requested that could include analytical data or a sample to be analyzed. If the waste cannot be received, the CWC pursues acceptance of

the waste at an alternative TSD unit or request the generator to pursue acceptance at an offsite facility or another approved facility.

2.7.2 Receipt of WRP Waste

For container receipt inspection of WRP waste sections are conducted in accordance with Section 2.2.1.

2.7.3 Physical Screening of WRP Waste

Physical screening using NDE described in Section 2.2.2.2 will be used but not as a condition of acceptance into CWC.

2.7.4 Chemical Screening of WRP Waste

Chemical screening will be used to resolve discrepancies under Section 2.5; however chemical screening is not used to accept this waste into CWC.

2.7.5 Evaluation of WRP containers with Residual Liquids Destined for Disposal at the Offsite Disposal Facility

The presence of other liquids in WRP waste containers or inner liners destined for disposal at the offsite disposal facility, which readily separate from the non-liquid portion of dangerous waste may be determined by either the paint filter test or through nondestructive examination results. When using nondestructive examination results, containers of WRP waste destined for disposal at the offsite disposal facility found to contain free liquid may be stored without separate spill containment provided that:

- Internal containers or liners contain less than 1 inch or 2.5 centimeters of liquid in the bottom of the container or liner
- Total residual liquid in any payload container (e.g., 55-gallon drum or standard waste box) will be less than 1 percent of the volume of that container
- Daily visual inspections of such containers are conducted.

2.8 Generated Waste

Waste generated by CWC is considered accepted at CWC when the waste is generated. Knowledge concerning the generated waste will be entered into the CWC operating record.

3.0 SELECTING WASTE ANALYSIS PARAMETERS

Physical/chemical screening parameters for verification must be chosen from those in Sections 3.1 and 3.2. Parameters for waste designation and to meet LDR requirements are addressed in Section 3.3. Each physical/chemical screening result must be in agreement with the shipping documentation to determine the acceptability of the result. Conformance issues identified during the confirmation process are documented and managed in accordance with Section 1.1.1.3. Parameters, methods, and rationale for physical/chemical screening parameters are provided in Table 3-1.

Table 3-1. Parameters and Rationale for Physical and Chemical Screening.

Parameter	Method[a]	Rationale for Selection
Physical Screening		
Visual inspection	Field method – observe phases, presence of solids in waste	Confirm consistency between waste and shipping documentation.
Nondestructive evaluation	Field method	Confirm consistency between waste and shipping documentation.
Chemical Screening		
Ignitability and/or headspace volatile organic compound screening	Organic vapor monitor, colorimetric gas sampling tubes, or a lower explosive level meter	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Peroxide	Field peroxide test paper	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Liquids	SW-846, Method 9095, Paint Filter Liquids Test	Confirm consistency between waste and shipping documentation.
pH	Field pH screen (pH paper method)	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Oxidizer	Field potassium iodide test paper	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Water reactivity	Field water mix screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Cyanides	Field cyanide screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Sulfides	Field sulfide screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Halogenated Organic Carbons	Screening test method for PCBs in transformer oil (SW-846, Method 9079)	Confirm consistency between waste and shipping documentation.

[a] Processes based on manufacturer's recommended methodology for test kit or testing equipment, unless otherwise noted. When regulations require a specific method, the method shall be followed.

3.1 Physical Screening Parameters

The following methods are approved for use in performing physical screening.

(1) Visual inspection (preferred method for physical screening):

Rationale. This method meets the requirement to ensure consistency between waste containers and the accompanying waste stream documentation.

Method: The container is opened and the contents are removed as needed for visual examination. Homogenous loose solids are probed to determine the presence of material not documented on the waste stream documentation, or for improperly absorbed liquids. Visual observations are compared with the applicable profile information and the container specific information in the waste stream documentation.

Failure criteria: A container fails inspection for any of the following reasons; (a) undocumented, improperly packaged, or inadequately absorbed liquids; (b) discovery of prohibited articles or materials listed in Section 1.2; (c) discovery of material not consistent with the applicable waste stream documentation ; and (d) variability greater than 25 percent by volume in listed constituents (e.g., paper, plastic, cloth, metal).

(2) NDE:

Rationale. This method meets the requirement to ensure consistency between waste containers and the accompanying waste stream documentation. This method also is subject to the QA requirements listed in Section 2.2.5. Containers that are not easily amenable to visual inspection because of physical or radiological content, or facility availability can be examined safely and economically.

Method: The container is scanned with a NDE system. Data are observed on a video monitor and captured and recorded. Personnel experienced with the interpretation of NDE imagery record their observations. These observations are compared to the contents listed on the waste stream documentation.

Failure criteria: A container fails the inspection for any of the following reasons; (a) undocumented, improperly packaged, or inadequately absorbed liquids; (b) discovery of prohibited articles listed in Section 1.2; (c) image data not consistent with the applicable waste stream documentation; and (d) variability greater than 25 percent by volume in listed constituents (e.g., paper, plastic, cloth, metal).

3.2 Chemical Screening Parameters

The following methods are approved for use in performing chemical screening tests. Chemical screening is used to verify that incoming waste is consistent with waste stream documentation. Failure of a chemical screening test is defined as a chemical screening result that is inconsistent with the associated waste stream documentation.

(1) Ignitability and/or headspace volatile organic compound screening:

Rationale: To determine the potential ignitability and the presence or absence of volatile organic compounds in waste, and to ensure that personnel are adequately protected. This method is used when containers are opened for inspection. This method can be applied to any matrix.

Method: A sample of the headspace gases in a container is analyzed by one or more of the following types of portable instrumentation: organic vapor monitor, colorimetric gas sampling tubes, or a lower explosive level meter.

Failure criteria: High organic vapor readings in matrices not documented as having volatile organic content constitutes failure.

(2) Peroxide screening:

Rationale: To determine the presence of organic peroxides in solvent wastes, to alert personnel to potential hazards, to ensure safe segregation and storage of incompatible wastes, and to confirm consistency with the waste stream documentation. The test is sensitive to low parts per million ranges.

Method: A peroxide test strip is dampened with a pipet sample of liquid waste. Solids are tested by first wetting the test strip with water and contacting a small sample of the waste. A blue color change indicates a positive reaction. The color change can be compared with a chart on the packaging to determine an approximate organic peroxide concentration.

Failure criteria: Peroxide concentrations greater than 20 parts per million in liquid waste constituents that are known organic peroxide formers not documented as having been stabilized constitutes failure. Results that are not consistent with documented constituents fails verification.

(3) Paint filter liquids test:

Rationale: To verify the presence or absence of free liquid in solid or semisolid material.

Method: To a standard paint filter, 100 cubic centimeters or 100 grams of waste are added and allowed to settle for 5 minutes. Any liquid passing through the filter signifies failure of the test. The required method for the paint filter liquids test is method 9095 in the U.S. Environmental Protection Agency (EPA), SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (the most recently promulgated version) (EPA 1986).

Failure criteria: Failure of the test in waste matrices not documented as having free liquids constitutes failure of the container. Small quantities of condensate trapped in inner plastic liner folds are acceptable.

(4) pH screen:

Rationale: To identify the pH and corrosive nature of an aqueous or solid waste, to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation.

Method: pH measurement is performed in accordance with SW-846. Processes are maintained by the CWC and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: If the pH of a matrix exceeds regulatory limits (less than or equal to 2.0 or greater than or equal to 12.5) in waste not documented as being regulated for this property, the container fails verification.

(5) Oxidizer screen:

Rationale: To determine if a waste exhibits oxidizing properties, to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation. This test can be applied to waste liquids, solids, and semisolids.

Method: 1 or 2 drops of 3N HCl acid is added to the Oxidizer test paper (potassium iodide, starch). The test paper is touched to a pea size sample of the waste to be tested. A black, blue/black, or purple color

change determines a positive oxidizer test. Processes are maintained by the CWC and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(6) Water reactivity screen:

Rationale: To determine if the waste has the potential to vigorously react with water to form gases or other reaction products. This information is used to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation.

Method: 2 or 3 drops of distilled water is added to an oxidizer test paper strip. The test paper is touched to a pea size sample of the waste to be tested. The observance of effervescence, a violent reaction, flaming or boiling indicates a positive test. Processes are maintained by the CWC and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(7) Cyanide screen:

Rationale: To indicate if waste could release hydrogen cyanide on acidification near pH 2. This information is used to ensure safe segregation and storage of incompatible waste and to confirm consistency with the waste stream documentation.

Method: A pea size sample of the waste to be tested is dissolved in a small quantity of water. A mixture of ferrous ammonium sulfate and ferrous ammonium citrate is added to the stoppered test tube. The sample is then shaken and 3N HCl is added to the solution. A dark Prussian blue color change indicates the presence of the acid. Processes are maintained by the CWC and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(8) Sulfide screen:

Rationale: To indicate if the waste could release hydrogen sulfide on acidification near pH 2. This information is used to ensure safe segregation and storage of incompatible wastes and to confirm consistency with the waste stream documentation.

Method: 5 drops of 3N HCl acid is added to a pea size sample of the waste to be tested. Lead acetate test paper is touched to the sample. A brown or black color change of paper indicates a positive test. Processes are maintained by the CWC and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(9) Halogenated Organic Carbons screen:

Rationale: To indicate whether PCBs or other chlorinated solvents are present in the waste. This information is used to confirm consistency with the waste stream documentation and to determine if additional information/data are needed to properly store and treat the waste.

Methods: Field organic chlorine tests appropriate to the matrix, such as those offered by the Dexsil Corporation (e.g., Chlor-N-Oil, Chlor-N-Soil), are used. These screening tests are available with several detection limits that enable the verification to be performed in the concentration range applicable to the proposed management path of the waste.

Failure criteria: A positive indication of chlorinated organics in a waste that is not documented as having chlorinated organic content constitutes failure.

3.3 Other Analysis Parameters

Parameters needed to meet designation, characterization, and LDR requirements for mixed and dangerous waste stored and/or treated at the CWC are identified in Table 3-2. The most recent promulgated method for SW-846 shall be used.

In determining the characteristic of ignitability, either the Pensky-Martens (method 1010) or the Setaflash (method 1020), must be employed when testing. The characteristic of corrosivity also requires a specific test method. When testing the pH of a given waste stream, method 9040 or method 9045 must be used in accordance with WAC 173-303-090(6).

Compliance with LDR for mixed and dangerous waste that have a treatment standard expressed as constituent concentrations in wastes (CCW) (40 CFR 268.40, incorporated by reference by WAC 173-303-140) can be shown using any appropriate method. If the waste treatment standard is expressed as constituent concentrations in waste extracts (CCWE) (40 CFR 268.40, incorporated by reference by WAC 173-303-140), then the Toxicity Characteristic Leaching Procedure (TCLP) EPA SW-846 Method 1311, which is specifically referenced in 40 CFR 268.41(a), must be performed. Following that, however, any appropriate method may be used to determine concentrations of hazardous constituents in the extract and to show compliance with LDR. Both Cyanides (Total) and Cyanides (Amenable) for nonwastewaters are to be analyzed using Method 9010 or 9012, as incorporated by reference in 40 CFR 260.11. UHCs will be evaluated as required by 40 CFR 268.48.

For other parameters or methods not otherwise specified, the following are acceptable sources of testing methods (standard methods):

- Analytical methods cited in WAC 173-303.
- The most recently promulgated version of *Test Method for Evaluating Solid Waste: Physical/ Chemical Methods*, SW-846, U.S. Environmental Protection Agency, EPA, Office of Solid Waste.
- Other current U.S. EPA methods, as applicable to the matrix under evaluation.
- *Standard Methods for the Examination of Water and Wastewater, American Public Health Association* (APHA), American Water Works Association, Water Environment Federation.
- *Annual Book of ASTM Standards, American Society for Testing and Materials.*
- *AOAC Official Methods of Analysis*, AOAC (Association of Official Analytical Chemists), International.

Appropriate QA/QC documentation is required to be maintained per Section 5.0, regardless of the method used.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Central Waste Complex.

Parameter		Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
General chemistry					
Flashpoint		1010/1020	Liquid	To provide documentation for safe storage conditions	To determine regulatory status as D001 waste, to provide proper waste designation and applicability of LDR requirements
pH	Liquid	9040	Liquid, sludge	To indicate the degree of corrosivity for safe handling; to provide for proper waste designation; and to identify waste that might compromise container integrity	To determine regulatory status as D002 waste, to provide proper waste designation, applicability of LDR requirements and state-only requirements.
	Solid	9045	Solid		
Hydroxide		9040	Liquid	To provide documentation for safe treatment and storage conditions; and to comply with the CWC waste acceptance criteria.	To provide proper waste designation and applicability of LDR requirements.
Water reactivity		Field method	Liquid, sludge	To determine whether the waste has a potential to violently react with water to form gases or generate heat; to provide documentation for safe treatment and/or storage conditions for waste designation; and to comply with the CWC is waste acceptance criteria.	To provide proper waste designation; safe storage and management.
Free liquids		9095	Liquid, sludge, solid	To determine applicability of LDRs and for characterization of appropriate treatment	To determine appropriate state-only LDR status of the waste.
Cyanide		9010/9012	Liquid, sludge, solid	For safe storage; for proper waste designation; applicability of LDR; and characterization of appropriate treatment	To provide proper waste designation and applicability of LDR requirements.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Central Waste Complex.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Sulfide	9030	Liquid, sludge, solid	For safe storage; for proper waste designation; applicability of LDR; and characterization of appropriate treatment	To provide proper waste designation and applicability of LDR requirements.
Organic analyses				
PCBs	8082	Liquid, sludge, solid	To determine proper waste designation for management of waste in accordance with the *Toxic Substance Control Act (TSCA) of 1976* and WAC 173-303.	To provide proper waste designation and to meet TSCA and LDR requirements.
Total organic carbon	9060	Liquid, sludge, solid	To determine applicability of LDR and applicability to state-only requirements.	To provide proper waste designation and applicability to state-only requirements, to meet LDR requirements, and comply with the CWC waste acceptance criteria.
Total organic halides	9020/9021/9022	Liquid, sludge	To determine proper waste designation and applicability to state-only requirements.	To provide proper waste designation and applicability to state-only requirements.
Persistent constituents	9075/9076/9077/ 9211/9212/9214/ 9250/9251/9253			
Total suspended solids	160.2[b]	Liquid, sludge	To determine applicability of LDR and status as a wastewater	To provide applicability of LDR and status as a wastewater.
Volatile organic compounds	1311/8260	Liquid, sludge, solid	To determine proper waste designation, applicability of LDRs, and characterization of appropriate treatment.	To provide proper waste designation, regulatory status, and applicability of LDR requirements.
Semi volatile organic compounds	1311/8270	Liquid, sludge, solid	To determine proper waste designation, applicability of LDRs, and characterization of appropriate treatment.	To provide proper waste designation, regulatory status, and applicability of LDR requirements.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Central Waste Complex.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Chlorinated herbicides	8151	Liquid	Not applicable	To provide proper waste designation and applicability to state-only requirements.
Inorganic analyses				
Arsenic	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Barium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Cadmium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Chromium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Lead	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Mercury	1311/7470/6020	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Silver	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Central Waste Complex.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Selenium	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Antimony	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.
Beryllium	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.
Nickel	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.
Thallium	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.

[a] Procedures based on EPA SW-846, unless otherwise noted. When regulations require a specific method, the method shall be followed.
[b] EPA-600/4-79/020 (EPA 1983), unless otherwise noted.
LDR = land disposal restriction.
PCB = polychlorinated biphenyls.

4.0 SELECTING SAMPLING PROCESSES

Specific sampling processes and techniques depend on both the nature of the material and the type of packaging. Waste samples are handled and preserved as necessary to protect the sample. For treatment, preservation techniques, and holding times the CWC shall utilize the processes and techniques recommended in SW-846. This section describes the sampling methodology used to obtain representative samples. DQOs have been established with Ecology in accordance with TPA Action Plan Section 6.5 (Ecology et al. 2003) and have been documented and reflected in this WAP.

4.1 Sampling Strategies

Table 4-1 contains waste forms and sample equipment used to sample referenced waste. Sampling of these waste forms is performed in accordance with Table 4-1.

4.2 Sampling Methods

Samples are processed at one of several laboratories qualified to perform analysis of waste samples (refer to Section 5.0). Sampling methods are those described in WAC 173-303 110(2) and incorporated by reference into this plan.

The basic sampling sequence includes the following:

- Obtain a unique sample number and complete the sample tag before sampling
- Obtain a precleaned sampler and sample bottles
- Attach sample label to sample bottles
- For sampling liquid waste, use a sampler or pipet to sample for two phase liquids. Homogeneous liquids in small containers will be poured into a sample bottle
- For sampling solid waste, use a scoop, trier, or hand auger to obtain a sample of the waste. For large containers of waste, composite several augers or scoops to ensure samples are representative
- Fill sample containers in the following sequence: volatile organics, semivolatile organics, metals, ignitability, pH (corrosivity)
- For solid waste, wipe the exterior surfaces of the sample bottles with a dry rag
- Attach sample labels to outer plastic bags
- Place samples in an appropriate receptacle for transfer to the laboratory
- Complete the chain-of-custody forms
- Seal and mark the receptacle in accordance with WAC 173-303-071(3)(1)
- Transfer receptacle to the analytical laboratory, as appropriate to meet sample holding times
- Properly clean and decontaminate nondisposable sampling equipment or package for return to central sampling equipment decontamination area according to onsite requirements.

4.3 Selecting Sampling Equipment

Sampling equipment selection is detailed in Table 4-1. Sampling equipment needed to sample waste is maintained and decontaminated as necessary by the CWC to ensure representative samples according to SW-846.

4.4 Sample Preservation

Sample preservation follows SW-846 protocol; however, other approved preservation methods can be used.

4.5 Establishing Quality Assurance and Quality Control For Sampling

This WAP incorporates the requirements of Permit Condition II.E, for QA/QC. Sample collectors prepare a permanent log of sampling activities in accordance with SW-846, Chapter 9.0. Records are maintained in accordance with Section 8.0 of this WAP. Log entries include as appropriate: date of collection, time of collection, location, batch number, sample number, tank number, copy of the chain-of-custody form, sampling methodology, container description, waste matrix (liquid), description of generating process (e.g., decontamination activities), number and volume of samples, field observations, field measurements (e.g., pH, percent lower explosive limit), laboratory destination and laboratory number, and signature. These log entries are made by the appropriate personnel while the sampling is performed. The logs or copies of logs are maintained in the CWC operating record after completion of sampling activities.

A chain-of-custody record accompanies samples at all times. The CWC shall maintain written chain-of-custody processes to ensure accountability of waste sample handling and to ensure sample integrity. All samples are labeled with a unique identifier.

During all sampling activities, strict compliance with applicable industrial hygiene and safety standards is mandatory. Appropriate sampling and decontamination processes are used.

The following QA/QC elements are used by the CWC to ensure sampling activities for designation purposes result in acceptable laboratory data:

- Representative sampling methods as defined by WAC 173-303-110(2); 40 CFR 261 Appendix I; and/or SW-846 Chapter 9.0
- Appropriate sample containers and equipment
- Samples numbered
- Traceable labeling system
- Field QA/QC samples (applicable SAP)
- Equipment calibration (current as appropriate)
- Chain-of-custody.

Table 4-1. CWC Chemical Screening Sampling Equipment.

Waste form	Reference in SW-846, Chapter 9.0	
	Waste type	Equipment*
Liquids	Free-flowing liquids and slurries	COLIWASA, glass thief or pipet
Solidified liquids	Sludges	Trier, scoops and shovels
Sludges	Sludges	Trier, scoops and shovels
Soils	Sand or packed powders and granules	Auger, scoops and shovels
Absorbents	Large-grained solids	Large trier, scoops and shovels
Wet absorbents	Moist powders or granules	Trier, scoops and shovels
Process solids and salts	Moist powders or granules	Trier, scoops and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, scoops and shovels
	Large-grained solids	Large trier, scoops and shovels
Ion exchange resins	Moist powders or granules	Trier, scoops and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, scoops and shovels

COLIWASA = composite liquid waste sampler.
* other ASTM-approved equipment could be used to collect samples.

The equipment requirements of Table 4-1, as amended by any Permit conditions, apply to sampling for chemical screening. In addition, the following sampling equipment may be used in sampling for chemical screening: (1) For liquids and slurries – dip, tank, bomb, and bailer samplers, as well as tube-type samplers (e.g., thin-walled Shelby tubes, split spoons, probes); and (2) For sludges and solids – tube-type samplers and augers; for small containers, a spoon may be used in place of a scoop.

5.0 LABORATORY SELECTION AND QUALITY ASSURANCE/QUALITY CONTROL

The selection of any laboratory shall be based on the ability of the laboratory to demonstrate compliance to this section with experience and capability in the following major categories:

- Comprehensive written QA/QC program
- Technical analytical expertise
- Effective information management systems.

The QA and QC requirements outlined in this section are applicable to laboratory activities governed by this WAP.

5.1 Evaluation of Laboratories

All laboratories providing analytical support to the CWC are required to have a current, laboratory approved QA plan. The laboratory QA plan shall be submitted to the CWC, and if necessary to Ecology in accordance with TPA Action Plan Section 6.5 (Ecology et al. 2003), for review and acceptance before commencement of analytical work. The QA plan shall, at a minimum, address the following elements:

- Sample custody and management practices (also refer to Section 4.0)
- Sample preservation protocols
- Sample preparation and analytical process requirements
- Instrument maintenance and calibration requirements
- Internal QC measures, e.g., method blanks, spikes
- Corrective action process.

Each laboratory shall be audited periodically by an independent organization to evaluate the effective implementation of the laboratory's QA/QC program. QA personnel and a technical expert shall evaluate the laboratory through onsite observations and/or reviews of the following documentation: copies of the QA/QC documents; records of surveillances/inspections; audits; non-conformances, and corrective actions. The CWC shall ensure independent organizations; QA personnel and technical experts are qualified to perform these evaluations.

5.2 Quality Assurance/Quality Control Objectives

The overriding goal of the analytical program is to support the accurate designation of waste and/or demonstrate compliance to LDR standards. Laboratory QA/QC programs shall be designed to meet the following objectives.

- Minimize errors. Errors could be introduced during preparative, analytical, and/or reporting phases of work. QC program elements include analysis of samples to written and approved processes and certification of the laboratory.

- Provide information. The designation of waste relies on a combination of knowledge and data. QA/QC programs that ensures accurate, precise, reliable, and reproducible data.

Key QA program elements are designed to provide objective evidence that waste analysis methods meet the performance specifications of the CWC. QA activities and implementation responsibilities are as follows:

- Activity based laboratory inspections. Inspections are performed by the CWC. Inspections verify that specific guidelines, specifications, or processes for the activities are completed successfully.

- Laboratory analyses. Analyses are performed by onsite or offsite laboratories on samples of waste using written and approved processes.

- Development of inspection checklists. Checklists are required for laboratory inspections and are designed to ensure that the inspected activity is consistently addressed. Checklists are completed during the inspection to document results.

- Instrument calibration and calibration verification. These activities are performed by the laboratory and are required for ensuring data of known accuracy and precision. Calibration data are maintained and stored to ensure traceability to reported results.

5.3 Laboratory Quality Assurance/Quality Control

All analytical work shall be defined and controlled by a statement of work, work order, or other work authorizing documentation. These authorizations documents shall include QA performance requirements. Samples will be handled according to approved, written and controlled laboratory processes. The accuracy, precision, and limitations of analytical data are evaluated through QC performance.

As needed, the CWC will conducts analyses to determine completeness of information and whether waste meets the acceptance criteria for treatment, storage, or disposal at one of the Hanford Facility TSD units or those of a chosen offsite TSD facility. Testing and analytical methods will depend on the type of analysis sought and the reason for needing the information. For parameters or methods not otherwise specified in Section 3.0, the following are acceptable sources of testing methods (standard methods).

- Analytical methods cited in WAC 173-303;

- The most recently promulgated version of *Test Method for Evaluating Solid Waste: Physical/ Chemical Methods*, SW-846, U.S. Environmental Protection Agency, EPA, Office of Solid Waste;

- Other current U.S. EPA methods, as applicable to the matrix under evaluation;

- *Standard Methods for the Examination of Water and Wastewater, American Public Health Association* (APHA), American Water Works Association, Water Environment Federation;

- *Annual Book of ASTM Standards, American Society for Testing and Materials*;

- *AOAC Official Methods of Analysis*, AOAC (Association of Official Analytical Chemists), International.

Other laboratory approved, written and controlled analytical methods, proprietary methods, and non-standard methods may be needed to develop operational and safety related information.

5.4 Data Assessment

Data used for decision making need to be scientifically sound, of known quality, and thoroughly documented. Data validation is not required; however, the CWC is responsible to ensure that data assessment or evaluation is completed. Data are assessed to determine compliance with quality standards approved by Ecology and established by this Permit in Section 5.3 are as follows.

Precision – The overall precision shall be the agreement among the collected samples (duplicates) for the same parameters, at the same location, subjected to the same preparative and analytical techniques. Analytical precision shall be the agreement among individual test portions taken from the same sample, for the same parameters, subjected to the same preparative and analytical techniques.

Accuracy – Accuracy of the measurement system shall be evaluated by use of various kinds of QA samples, including, but not limited to, certified standards, in-house standards, and performance evaluation samples.

Representativeness – Representativeness addresses the degree to which the data accurately and precisely represent a real characterization of the waste stream, parameter variation at a sampling point, sampling conditions, and the environmental condition at the time of sampling. The issue of representativeness is addressed for the following points:

- Based on the generating process, the waste stream, and its volume, an adequate number of sampling locations are selected;
- The representativeness of selected media has been defined accurately;
- The sampling and analytical methodologies are appropriate;
- The environmental conditions at the time of sampling are documented.

Completeness – Completeness is the amount of usable data obtained from a measurement system compared to the total amount of data requested.

Comparability – Comparability is the confidence with which one data set can be compared to another. This usually is accomplished by application of statistical methods.

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6.0 SELECTING WASTE RE-EVALUATION FREQUENCIES

The waste profile and supporting data and documentation shall be re-evaluated at least annually, or more often, if the generator has informed the CWC of a change in the waste generation process, or if waste received at the CWC or the description on the shipping documentation does not match the waste profile. If the generator has informed the CWC of a change in the waste generation process, the waste re-enters the waste stream approval process described in Section 2.1.1. The CWC will evaluate verification data against the waste profile to identify any waste streams for which a change in waste generation process is suspect. If a waste stream is suspect, that waste stream will re-enter the approval process described in Section 2.1.1.

When a waste profile is re-evaluated, the CWC could request the generator to do one or more of the following:

- Verify accuracy of current waste profile;
- Supply a new waste profile;
- Submit a sample to confirm the waste is still within the profile parameters.

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7.0 SPECIAL WASTE ANALYSIS PROCEDURAL REQUIREMENTS

This section discusses any special process requirements for receiving mixed waste at the CWC.

7.1 Processes for Receiving Onsite and Offsite Waste

The processes for receiving waste are described in Section 2.0. In general, mixed waste received from onsite generators is managed the same as waste received from offsite generators. Differences include, but are not limited to the following: (1) physical/chemical screening frequencies for verification [minimum percentages of 5 percent for waste from onsite generators and 10 percent for waste from offsite generators (note that chemical screening frequency depends on the physical screening frequency)], (2) shipping documentation (Uniform Hazardous Waste Manifests are used for waste from offsite generators and shipping documents are used for waste from onsite generators), and (3) LDR documentation requirements for mixed or dangerous waste (notification for waste from offsite generators and equivalent information from onsite generators).

7.2 Processes for Ignitable, Reactive, and Incompatible Waste

The CWC accepts ignitable, reactive, or incompatible waste (refer to Section 1.2). Pre-shipment review and/or chemical screening requirements in Section 2.0 are used to identify whether the waste is ignitable, reactive, or incompatible. The CWC waste acceptance criteria identifies certain management requirements for ignitable, reactive, and incompatible waste, ensuring the waste is stored in a safe manner. Precautions are taken when ignitable, reactive, or incompatible waste is stored within the CWC.

7.3 Provisions for Complying With Federal and State Land Disposal Restriction Requirements

State-only and federal LDR requirements restrict the land disposal of certain types of waste subject to *Resource Conservation and Recovery Act* (RCRA) *of 1976* and the *Hazardous Waste Management Act of 1976*. Waste managed on the Hanford Facility falls within the purview of these LDRs per 40 CFR 268 and WAC 173-303-140. Waste constituents that are subject to LDRs are identified in 40 CFR 268.40 and referenced by WAC 173-303-140. Waste must meet certain treatment standards, as specified in 40 CFR 268 and/or WAC 173-303-140, if the waste is to be land disposed.

Generators determine if LDRs apply to the mixed or dangerous waste based on knowledge or testing [40 CFR 268.7(a)]. Each waste is analyzed for those LDR constituents contained in the listed and characteristic waste numbers identified by the generator, including any UHC identified by 40 CFR 268.2(i), if the knowledge of the generator is not sufficient to make a determination. If the LDR waste does not meet the applicable treatment standards, the generator provides waste information with each shipment stating so in accordance with WAC 173-303-380(1)(j),-(k),-(l),-(m),-(n), or -(o). If the waste meets the LDR standards, the generator must send a certification that the waste meets the treatment standards.

7.3.1 Waste Treatment

Waste is treated to meet LDR as specified in 40 CFR 268 and WAC 173-303-140 with the exception of mixed waste designated by the Secretary of Energy for a disposal facility pursuant to the *Land Withdrawal Act*, as amended.[3] Mixed waste is treated to the applicable standards required by the disposal facility or other applicable requirements. The CWC potentially can partially treat or pre-treat certain waste before shipment to a permitted offsite facility that could perform full treatment of the specific waste to meet LDR treatment requirements. Waste requiring treatment other than what the CWC can provide is repackaged, labeled, and

[3] Subject to "*State of Washington v. Bodman,*" presently on appeal before the United States Court of Appeals for the Ninth Circuit, No. 06-35227.

transferred to a TSD unit for storage pending identification or development of an appropriate treatment. Prior to treatment of waste, the CWC will have in place processes to ensure safe waste treatment as defined in Section 1.1.3 of this WAP. When characteristics of the waste are changed as a result of treatment or other processing, documentation will be entered into the unit-specific operating record. Dangerous waste is shipped to an offsite TSD for treatment.

When evaluating the treatability of certain characteristic waste, consideration must be given to any additional UHCs that might be found in certain characteristic waste. The treatment standards, for the most part, are concentration-based. When the concentration-based standards are used, the constituent concentrations for the waste must fall below those specified in 40 CFR 268.40 and/or 268.48 for UHCs and in WAC 173-303-140 for land disposal without treatment. If the concentrations exceed these limits, the waste must be treated before disposal. The alternative treatment standards for hazardous debris as specified in 40 CFR 268.45 or for contaminated soil as specified in 40 CFR 268.49, or for labpacks in 40 CFR 268.42(c) could also be used.

Treatment can consist of, deactivation (neutralization, cementing, absorption), stabilization (cementing, absorption, and encapsulation); compaction, sorting, and repackaging of waste.

Deactivation is used to remove the hazardous characteristics of the waste due to its ignitability (D001), corrosivity (D002), solid corrosive acid (WSC2), and/or reactivity (D003). Treatment techniques could include neutralization, absorption, cementing, controlled reaction with water, and macro-encapsulation.

- Neutralization is the primary method of treatment for corrosive waste that has a pH less than or equal to 2 and/or greater than or equal to 12.5. Examples of bases that could be used to neutralize acids are sodium hydroxide, calcium hydroxide, or calcium carbonate. Examples of acids that could be used to neutralize bases are hydrochloric acid and sulfuric acid.

- Absorption is the primary method of treatment for ignitable waste, which include waste that is liquid and has low total organic carbon content (less than10 percent). Absorbent material that could be used includes polyacrylates, polypropylene, superabsorbent polymer, cellulose, or other absorbent materials that meets applicable disposal requirements.

- Cementing or grouting is the primary method of treatment for ignitables consisting of metal fines or other corrosive materials. These types of waste are deactivated by mixing and binding it with an inert cementacious material.

- Encapsulation is a treatment for debris.

Stabilization methods used by the CWC include cementing or grouting, sealing, and absorption. Particulates and/or liquid waste containing hazardous constituents could be cemented or grouted at the CWC to meet either disposal facility waste acceptance criteria, and/or the disposal criteria of future TSD units. These types of waste are stabilized by mixing and binding the waste with an inert material. The inert material generally used is Portland cement. When dealing with some waste streams, such as sludges that might contain an inconsistent or excess liquid content, absorbent could be added to the waste to provide a drier matrix to allow identification of the proper combination of ingredients to ensure a successful stabilization effort.

Treatment of state-only extremely hazardous waste (WT01, WP01, and WP03) is performed in accordance with Revised Code of Washington (RCW) 70.105.050(2) for mixed waste and/or WAC 173-303-140(4)(a) for dangerous waste as applicable.

Waste managed at the CWC is treated to meet either concentration-based treatment standards or technology-based standards. The alternative treatment standards for hazardous debris as specified in 40 CFR 268.45 or for contaminated soil as specified in 40 CFR 268.49 also could be used. When dealing with

multiple dangerous waste numbers, both standards could apply, requiring a treatment train for ultimate compliance to LDR. In most cases, stabilization treatment is at the end of the treatment train. In some instances, as with the cementing process, treatability studies could be performed to ensure that when the waste is treated, LDR requirements are met.

Grab samples are collected on each batch of concentration-based treated waste to ensure that the treatment process was successful. For specified technologies, the CWC operating record contains information to demonstrate the treatment process was well designed and well operated.

7.3.2 Sampling and Analytical Methods

Section 3.3 defines the parameters and methods needed to demonstrate compliance to LDR treatment standards. It is recognized that ALARA concerns may warrant modifications to the methods to ensure appropriate protection of personnel health and safety without impact to the method or sample integrity. Waste analyzed using SW-846 methods modified to address ALARA protection concerns are considered acceptable provided applicable data quality objectives can be met.

Samples of waste are transferred to the sample management area for packaging and transferred to an onsite laboratory or shipped offsite to a laboratory for analysis. Samples are collected in accordance with SW-846 and as described in Section 4.0. Storage is provided for waste containers while waiting laboratory analysis results.

7.3.3 Land Disposal Restriction Certification of Treatment

When LDR treatment has been completed and analytical results (if applicable per 40 CFR 268.40 and WAC 173-303-140) have verified the LDR treatment is successful, certification of the LDR treatment is required by the CWC. The certification statement is prepared by the unit in accordance with 40 CFR 268.7b, d, and e. A copy of the certification is placed in the CWC operating record.

When a LDR waste does not meet the applicable treatment standards set forth in 40 CFR 268.40 and WAC 173-303-140, or exceeds the application prohibition levels set forth in 40 CFR 268.32 or Section 3004(d) of RCRA, this information is placed in the CWC operating record, in accordance with WAC 173-303-380(1)(k), (n), and -(o).

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8.0 RECORDKEEPING

Recordkeeping requirements applicable to this WAP are described in the *Hanford Facility RCRA Permit*, Attachment 33, General Information Portion, Table 12.1 (Ecology 2004) and this WAP.

The CWC maintains the waste stream documentation or other approved processes, supporting documentation, and associated QA/QC data described in this WAP in accordance with the requirements in Permit Condition II.I (Ecology 2004).

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HNF-2165
Revision 6

Waste Receiving and Processing Facility Waste Analysis Plan

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

FLUOR®
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Richland, Washington

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FLUOR.
P.O. Box 1000
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A. D. Rasalal 04/10/2008
Release Approval Date

Approved for Public Release;
Further Dissemination Unlimited

EXECUTIVE SUMMARY

The Waste Receiving and Processing Facility provides storage, treatment, and confirmation of dangerous waste, Waste Retrieval Project waste, and/or mixed waste from onsite generators, onsite Solid Waste Operations Complex-generated waste units, Waste Receiving and Processing Facility-generated waste, or offsite generators (hereafter referred to as the 'generator' unless otherwise denoted in this waste analysis plan). The Solid Waste Operations Complex treatment, storage, and/or disposal units consist of Central Waste Complex, Waste Receiving and Processing Facility, Low-Level Burial Grounds, and T Plant Complex. This waste analysis plan provides processes to obtain information on the chemical, biological, and physical characteristics of the waste managed to meet the requirements of Washington Administrative Code 173-303-300, *General Waste Analysis*.

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CONTENTS

FIGURES

TABLES

ACRONYMS

ALARA	as low as reasonably achievable
AOAC	Association of Official Analytical Chemists
APHA	American Public Health Association
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Materials
CAP	corrective action plan
CCW	constituent concentrations in waste
CCWE	constituent concentrations in waste extract
COLIWASA	composite liquid waste sampler
CFR	Code of Federal Regulations
CWC	Central Waste Complex
DOE-RL	U.S. Department of Energy, Richland Operations Office
DQO	data quality objectives
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
HNF	Hanford Nuclear Facility (document identifier)
LDR	land disposal restriction
LLBG	Low-Level Burial Grounds
MSDS	material safety data sheet
NDA	nondestructive assay
NDE	nondestructive examination
NIOSH	National Institute for Occupational Safety and Health
PCB	polychlorinated biphenyl
PES	performance evaluation system
pH	negative logarithm of the hydrogen-ion concentration
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
RCW	Revised Code of Washington
SAP	sampling and analysis plan
SWOC	Solid Waste Operations Complex
T Plant	T Plant Complex
TCLP	toxicity characteristic leaching procedure
TPA or Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSCA	*Toxic Substances Control Act of 1976*

TSD	treatment, storage, and/or disposal
UHC	underlying hazardous constituents
WAC	Washington Administrative Code
WAP	waste analysis plan
WRAP	Waste Receiving and Processing (Facility)
WRP	Waste Retrieval Project

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	Meters	3.28084	feet
yards	0.9144	meters	Meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
Mass (weight)			**Mass (weight)**		
ounces (avoir)	28.34952	grams	Grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			**Volume**		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	Liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	Liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds (force) per square inch	6.894757	Kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Third Ed., 1990, Professional Publications, Inc., Belmont, California.

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WASTE RECEIVING AND PROCESSING FACILITY WASTE ANALYSIS PLAN

1.0 UNIT DESCRIPTION

In accordance with the regulations set forth in the Waste State Department of Ecology Dangerous Waste Regulations, Washington Administrative Code (WAC) 173-303-300, this waste analysis plan (WAP) has been prepared for operation of the Waste Receiving and Processing Facility (WRAP) in the 200 West Area on the Hanford Site, Richland, Washington.

The purpose of this WAP is to ensure that adequate knowledge as defined in WAC 173-303-040, is obtained for dangerous and/or mixed waste accepted by and managed in WRAP.

This WAP documents the waste acceptance process, sampling methodologies, analytical techniques, and overall processes that are undertaken for waste accepted for storage and treatment at the WRAP. Specifically, this WAP contains information regarding the acceptance, confirmation, nondestructive examination (NDE) and nondestructive assay (NDA), repackaging, certification and management of waste including: types of knowledge, performance evaluation, physical and chemical screening, sampling and analysis, discrepant container management transport and associated quality assurance (QA)/quality control (QC) in the following sections. For a detailed description of the WRAP refer to Chapter 1.0, "Part A", and Chapter 4.0, "Process Information" (DOE/RL-91-16). Activities may be performed by the WRAP operating organization or its delegated representative.

1.1 Description of Unit Processes and Activities

WRAP is a nonland-based treatment, storage, and/or disposal (TSD) unit used for the treatment and storage of waste, and is subject to the *Dangerous Waste Regulations*, WAC 173-303. The WRAP consists of:

- 2336W Building (Main WRAP building)
- Shipping and Receiving area
- NDE and NDA Area
- Process area (including gloveboxes)
- Sample management area
- Administrative Area
- Exterior Loading Dock and Storage area
- 2336W South Outside Storage
- 2404-WB and 2404-WC Waste Storage Buildings.

The WRAP has many waste management capabilities including:

- Storing
- Receiving
- Opening containers
- Sampling
- Physical/chemical screening
- Sorting
- Treating
- Repackaging
- Certification (refer to Section 2.7).

Additional description can be found in the WRAP dangerous waste permit application Chapters 1.0 and 4.0 (DOE/RL-91-16). Refer to Figures 1-1, 1-2 and 1-3 for additional information on unit processes.

WRAP stores, repackages and ships dangerous waste for treatment and/or disposal offsite. WRAP's treatment of mixed waste includes deactivation (neutralization, cementing, absorption, and controlled reaction with water), stabilization (cementing, absorption, and encapsulation), and amalgamation; volume reduction of waste (i.e., supercompaction); and repackaging of waste. WRAP also certifies waste destined for disposal in an offsite facility pursuant to the *Land Withdrawal Act of 1996*. Certification activities include:

- Assess and evaluate the waste stream information previously generated.
- Receipt of either newly generated mixed waste and waste retrievably stored.
- Waste is then processed (e.g., segregation, treatment of non-conforming items. repackaged, head-space gas and other sampling as appropriate).
- Complete and submit a waste stream data package or certification file.
- Upon acceptance, the repackaged waste stream can then be sent offsite for disposal.

This process is often an iterative process and is subject to changes pending the offsite facility's requirements. Additional information can be found in Section 2.7.

Waste entering WRAP is in the form of drums, boxes, and other approved containers. Drummed waste is examined by NDE or NDA or both, and/or sent directly to the processing area or another TSD unit depending on the process information of the container and waste stream. Boxed waste is examined by NDE or NDA, or both. The boxed waste can be processed at WRAP or sent to another approved onsite or offsite facility for management or disposal.

The process area is 650-square meters and contains the 100 through 400 Series gloveboxes and de-lidding station. The process area gloveboxes are designed for opening, sorting, sampling to characterize or confirm the contents of containers, and treating mixed waste. Treatment of mixed waste includes deactivation, solidification, or absorption of liquids, neutralization of corrosives, amalgamation, microencapsulation, macroencapsulation, volume reduction of waste (e.g., super compaction), reaction of reactive waste, and repackaging of waste. Within 2336W building is a de-lidding station that is used for removing the inner lids of the 208-liter drum that is inside of a 322 liter overpack container.

The process area is designed to provide secondary containment when mixed waste containers are opened in the gloveboxes. Mixed waste could be processed and/or treated in any of the gloveboxes as required by WRAP processing needs. Automatic dry chemical fire extinguishment systems are provided inside the gloveboxes.

Compliant waste is waste that meets offsite TSD acceptance criteria and shipped for disposal.

Non-compliant waste is processed to meet the onsite and/or offsite TSD requirements. Once all waste is processes (e.g., sampled, screen, segregated, treated, repackaged) the waste is shipped to the appropriate onsite or offsite TSD unit.

1.1.1 Waste Acceptance, Movement, Processing, and Management

The WRAP uses waste tracking processes to ensure that the waste received at the WRAP matches the manifest or transfer papers, to ensure that the waste is tracked through the WRAP to final disposition, and to maintain the information required in WAC 173-303-380. Waste is tracked through processing such as

segregation, repackaging, treatment, and/or intra-TSD unit transfers. The waste tracking process provides a mechanism to track waste through a uniquely identified container (refer to Figure 1-3). The unique identifier is a barcode (or equivalent) that is recorded in an electronic data tracking system. This mechanism encompasses waste acceptance, movement, processing, and management of waste. When a new container is used, identification numbers are assigned and maintained as the waste moves through WRAP. The container identification number allows the WRAP to link to hard copy or electronic copy of records that are maintained as part of the operating record to retain information on the location, quantity, and physical and chemical characteristics of the waste.

The following sections and Figure 1-1 and Figure 1-2 describe the process for waste acceptance and different types of information and knowledge reviewed/required during the acceptance process. The process for management of waste is described in Chapter 4.0.

1.1.1.1 Narrative Process Descriptions

Waste that meets applicable LDR requirements, as specified WAC 173-303-140, which incorporates by reference 40 CFR 268, is stored at the WRAP. Mixed waste that does not meet LDR requirements, as specified in 40 CFR 268 and WAC 173-303-140, is stored until the waste is processed for repackaging or further treatment at the WRAP or another approved location. The WRAP operating record contains information necessary to meet LDR requirements (Sections 2.1.3.2 and 7.3). Containerized waste that is not fully characterized or is awaiting analytical results can be stored at the WRAP as well. The Hanford Facility is required to test certain mixed wastes when treatment standards are expressed as a concentration to ensure that the waste or treatment residues are in compliance with applicable LDR requirements (Section 2.1.3.2 and 7.3). Such testing is performed according to the frequency specified in this WAP, as specified in 40 CFR 268.7(b), incorporated by reference by WAC 173-303-140.

1.1.1.2 Waste Acceptance Process

The waste acceptance process for the WRAP consists of following activities:

- Waste Stream Approval. The generator provides information concerning each waste stream on a waste profile sheet. The waste stream information is reviewed against the WRAP waste acceptance criteria. If the waste stream information is sufficient and meets the applicable acceptance criteria, the waste stream is approved. In addition, the initial verification frequency for the waste is determined in accordance with the requirements found in the performance evaluation system (PES) program (Section 1.1.1.3). For a more complete description of the waste stream approval process, refer to Section 2.1.1.

- Waste Shipment/Transfer Approval. The generator provides specific data for each waste container on the container data sheet. The container data are reviewed against the waste profile sheet data and the WRAP acceptance criteria before being approved for shipment/transfer. In addition, the WRAP determines if any of the containers require verification based on the verification frequency as determined by the PES. For a more complete description of the waste shipment/transfer approval process, refer to Section 2.1.2.

- Verification. All waste streams are subject to receipt inspection during the waste shipment acceptance process. The percentage of the waste stream selected for physical and/or chemical screening is determined in accordance with the requirements found in the PES program (Section 1.1.1.3). Containers are opened and verified visually or by NDE. Of those containers subjected to physical screening, a percentage is subject to chemical screening via field or laboratory analysis. All

information and data are evaluated to confirm that the waste matches the waste profile and container data/information supplied by the generator.

1.1.1.2.1 Waste Acceptance Process Between Solid Waste Operations Complex TSD Units

Waste transfers between Solid Waste Operations Complex (SWOC) TSD units could be necessary to support Hanford Site goals. In these instances a waste stream profile, or other approved processes that already has been developed, may be used to support these activities. A container may be transferred between SWOC facilities to accommodate the verification activities. A documented review is required to ensure compliance with the WRAP waste acceptance criteria. All waste transfers and containers are subject to receipt inspection. For waste that has not been accepted at CWC, LLBG, WRAP, or T Plant Complex TSD units; physical and or chemical screening will be completed as described in Sections 3.1, 3.2, and 3.3. The individual container data, inclusive of all knowledge obtained on the waste is compared to the WRAP waste acceptance requirements. Previously accepted waste that has not been considered for verification will be verified prior to transfer between SWOC TSD units. For a more complete description of the transfer process, refer to Section 2.3.

1.1.1.2.2 Types of Knowledge

When collecting documentation on a waste stream or container, the WRAP must determine if the information provided by the generator meets the definition of knowledge in WAC 173-303-040. Knowledge requirements are met by sampling and analysis, and/or process knowledge. Process knowledge consists of detailed information from existing published or documented waste analysis data or studies on processes similar to those that generated the waste, including but not limited to the following:

- Mass balance from a controlled process that has a specified input for a specified output
- Material safety data sheets (MSDSs) on unused chemical products
- Test data from a surrogate sample
- Analytical data on the waste or a waste from a similar process.
- Interview information
- Logbooks
- Procurement records
- Qualified analytical data
- Processes and/or methods
- Process flow charts
- Inventory sheets
- Vendor information
- Mass balance from an uncontrolled process (e.g., spill cleanup)
- Mass balance from a process with variable inputs and outputs (e.g., washing/cleaning methods).

This information will be sufficient to quantify constituents and characteristics to safely manage in compliance with WRAP acceptance criteria and WAC 173-303. The WRAP acceptance criteria is defined as the requirements found in this WAP and the associated WRAP dangerous waste permit application Part A.

1.1.1.3 Description of Performance Evaluation System (PES)

The PES acting as an agent of WRAP determines the initial physical screening frequency of each waste stream. PES provides a periodic status of an individual generator's performance for waste received. PES provides a mechanism for determining corrective actions, resolving waste acceptance issues, and physical

screening frequency adjustments when a conformance issue has been discovered for newly generated waste.

1.1.1.3.1 Initial Physical Screening Frequency Determination

The initial physical screening frequency is determined based on the following process.

- Personnel responsible for waste receipt at the WRAP review the generator waste profile information to determine the relative potential for misdesignation or inappropriate segregation based on all relevant information, including any previous experience with the generator. Based on this review, any concerns are identified associated with the following criteria:
  - documented waste management program
  - waste stream characterization information
  - potential for inappropriate segregation.

- Based on the identification of concerns during the review, an initial physical screening frequency is established for the new generator's waste stream based on the following criteria:
  - Initial physical screening frequency of, at a minimum, 20 percent: No concerns identified (e.g., cleanup of contaminated soil where the soil has been well characterized and no other waste generation processes are occurring at that location)
  - Initial physical screening frequency of, at a minimum, 50 percent: Concern(s) identified in one criterion
  - Initial physical screening frequency of 100 percent: Concerns identified in two or more criteria.

1.1.1.3.2 Performance Evaluation

A performance evaluation is used to trend a generator's waste acceptance performance and is used to adjust the generator's overall physical screening frequency. This evaluation, identified as an integral part of the QA program, is objective and considers the conformance issues documented during the Preshipment Review and Verification functions. The PES maintains processes that: (1) perform evaluations based on conformance issues identified, (2) evaluate unsatisfactory performance for corrective actions, and (3) adjust physical screening rates accordingly.

The performance evaluation is conducted and subsequently accepted by PES team, and the documentation maintained in accordance with Section 8.0. Performance evaluation frequency is based on the generators historical performance and the waste stream in involved.

1.1.1.3.3 Conformance Issue Resolution

Conformance issues could result in a waste container that does not meet the WRAP waste acceptance criteria. A conformance issue is any discrepancy identified during the confirmation process with waste package documentation, a waste package, or a shipment. Discrepancies can be identified during preshipment reviews of waste streams during the verification process. If a possible conformance issue is identified, the following actions are taken to resolve the issue.

- The PES compiles all information concerning the possible conformance issue(s).

- The generator is notified and requested to supply additional knowledge that may assist in the resolution of the concern(s). If the generator supplies information that resolves the concern(s) identified, no further action is required.

- On determination that a conformance issue has been identified during verification, the WRAP personnel and the generator discuss the conformance issue and identify the appropriate course of action to resolve the container in question, e.g., pick another sample set, return the container, divert the container to another TSD unit that can accept the container and resolve the issue, or the generator resolves the issue at the WRAP. If the conformance issue(s) results in a waste stream failure, the physical screening frequency for all waste streams that have the potential to exhibit a similar conformance issue from the generator are adjusted to 100 percent for the next shipment until the issue(s) can be adequately addressed.

- The WRAP requests the generator to provide a corrective action plan (CAP) that clearly states the reason for the failure and describes the actions to be completed to prevent recurrence. The generator could request a reduction in verification of unaffected streams. This request must be accompanied by a justification that identifies why this stream(s) would not exhibit the same conformance issue.

- The WRAP reviews the CAP and stream justification for adequacy. If the CAP is inadequate, the generator remains at a physical screening rate of 100 percent. If the stream justification is adequate, the WRAP could provide an alternative frequency as denoted in Section 1.1.1.3.2.

1.1.1.3.4 Process for Reducing the Physical Screening Frequency

Physical screening (Section 2.2.2) rate frequencies and changes to those frequencies could be applied to a specific waste stream, to a specific contractor, or to a specific offsite generator based on the circumstances surrounding the conformance issue. After the initial physical screening frequency for a given waste stream has been established or increased, the physical screening frequency can be reduced in accordance with the following process.

The physical screening frequency is reduced in three steps. Reduction for all steps is based on the ability to demonstrate that five containers from the waste stream in question pass verification. In addition, reduction to the minimum frequency requires that the WRAP documents an acceptable evaluation of the corrective action plan. At no time will the physical screening frequency be reduced below 5 percent for waste generated onsite or below 10 percent for offsite generators.

Step 1) Reduce frequency by up to 66 percent after five containers from the waste stream in question pass verification.

Step 2) Reduce frequency established in Step 1 by up to 50 percent or to the minimum allowable whichever results in a greater frequency after five containers from the waste stream in question pass verification.

Step 3) Reduce frequency established in Step 2 to the minimum allowable after five containers from the waste stream in question pass verification. The WRAP documents an acceptable evaluation of the corrective action plan.

The physical screening rate reduction is established during periodic PES team evaluations, and the documentation is maintained according to Section 8.0 of this WAP. The percentage of the reduction is based on the evaluation of the relative severity of the original conformance issue, the status of the corrective action plan, any interim actions taken by the generator, the generator's performance for this waste stream before this reduction, and/or other factors deemed relevant.

1.1.2 Operating Conditions

The WRAP shall ensure that all waste management operations are conducted in accordance with design and engineering requirements of waste management structures and equipment, and with all equipment manufacture specifications and operating processes. Before treatment and/or storage of waste, the WRAP shall have processes in place to ensure safe management of the waste. These processes shall consider actual or potential risks posed by the waste and treatment and/or storage equipment. The WRAP shall conduct all waste treatment and/or storage according to these processes and comply with labeling, container management, and inspection requirements of WAC 173-303-630.

1.2 Identification and Classification of Waste

Dangerous and mixed waste is accepted for storage and/or treatment in the WRAP except for the following waste types:

- Bulk liquid waste in tankers
- Bulk solids in trucks or roll-off boxes
- Shock sensitive waste
- Class IV oxidizer waste
- Infectious waste.

Refer to Chapter 4.0 for precautions that are taken when ignitable, reactive, or incompatible waste is stored.

The WRAP manages the following waste types:

- Containerized liquids/free liquids
- Pressurized gas cylinders and aerosol cans
- Munitions/explosives (to be evaluated on a case-by-case basis)
- Bulk sodium metal
- Labpack liquids
- Solids/debris
- Sludges/soils.

These waste types could be classified as Waste Retrieval Project (WRP), mixed, and/or dangerous. Unless otherwise prohibited by this WAP, the waste could exhibit the characteristics of ignitable, toxic, corrosive, and/or reactive. In addition to the waste received at the WRAP for storage and/or treatment, the WRAP generates mixed and dangerous waste. This waste material consists of items such as, but not limited to, personal protective equipment (PPE), rags, and spent equipment contaminated with dangerous cleaning agents, lubricants, paints, or other dangerous materials that designate as dangerous wastes when discarded. Process knowledge, field screening, or sampling and analysis are used as appropriate to characterize these waste materials. Field screening and sampling are in accordance with this WAP and occur at the point of waste generation or at the location where the waste materials are stored.

Biological waste received from generators could consist of animal remains that were used for experiments. This type of waste is analyzed using NDE or visual examination.

1.2.1 Dangerous Waste Numbers, Quantities, and Design Capacity

The WRAP Part A identifies dangerous waste numbers, quantities, and design capacity.

Waste is designated pursuant to WAC 173-303 using manufacturer's product information, MSDS, laboratory analysis, and reference material such as *Registry of Toxic Effects of Chemical Substances* (NIOSH). Waste also is characterized in accordance with the requirements of 40 CFR 761.

Designation for Waste Types Reprocessed at WRAP:

Number	References
U and P numbers	WAC 173-303-9903-9904
F numbers	WAC 173-303-9904
WPCB	WAC 173-303-9904
D001	WAC 173-303-090(5)
D002	WAC 173-303-090(6)
D003	WAC 173-303-090(7)
D004 through D043	WAC 173-303-090(8)
WT01 and WT02	WAC 173-303-100 and 104
WP01, WP02, and WP03	WAC 173-303-100 and 104
WSC2	WAC 173-303-090(6)/104

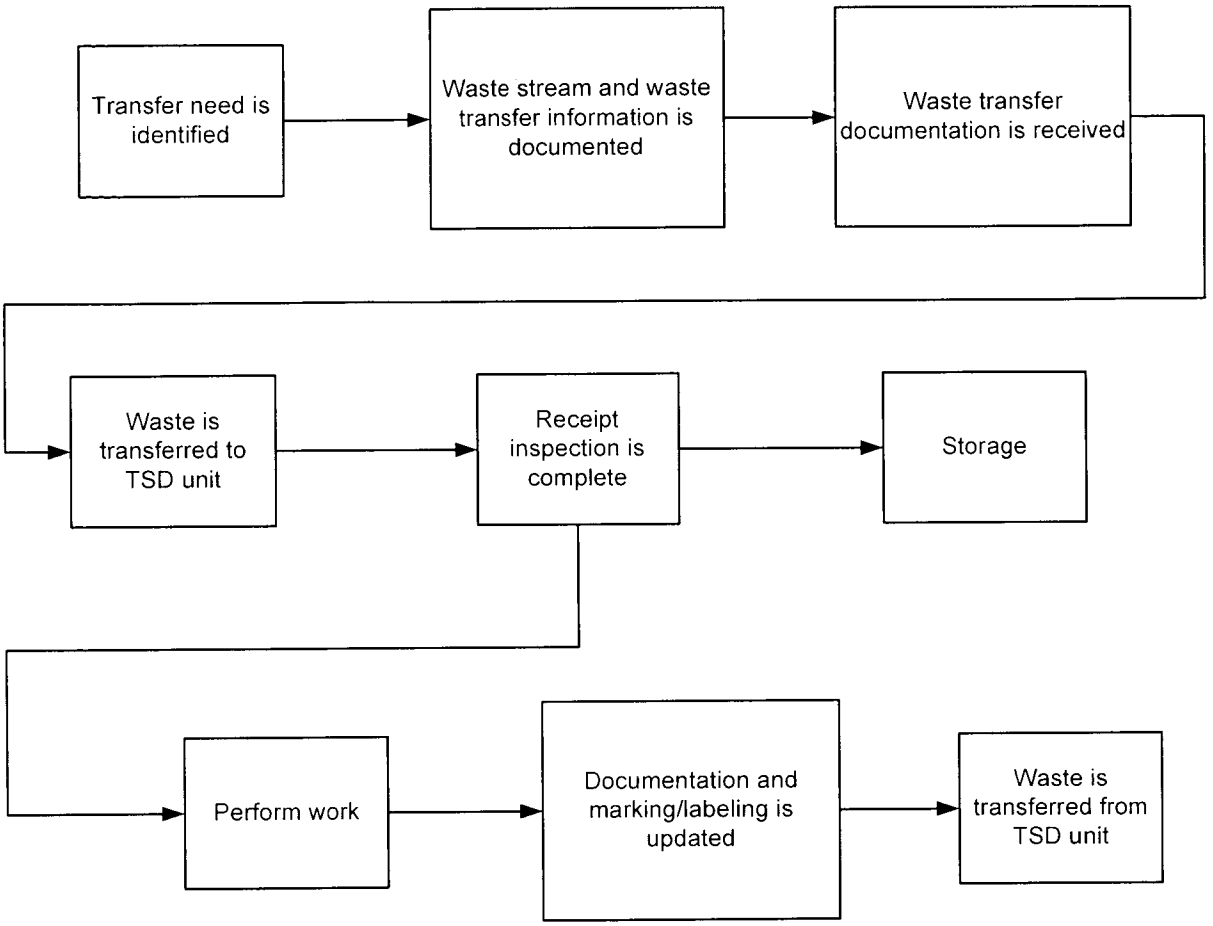

Figure 1-1. Waste Transfers Between Solid Waste Operations Complex TSD Units.

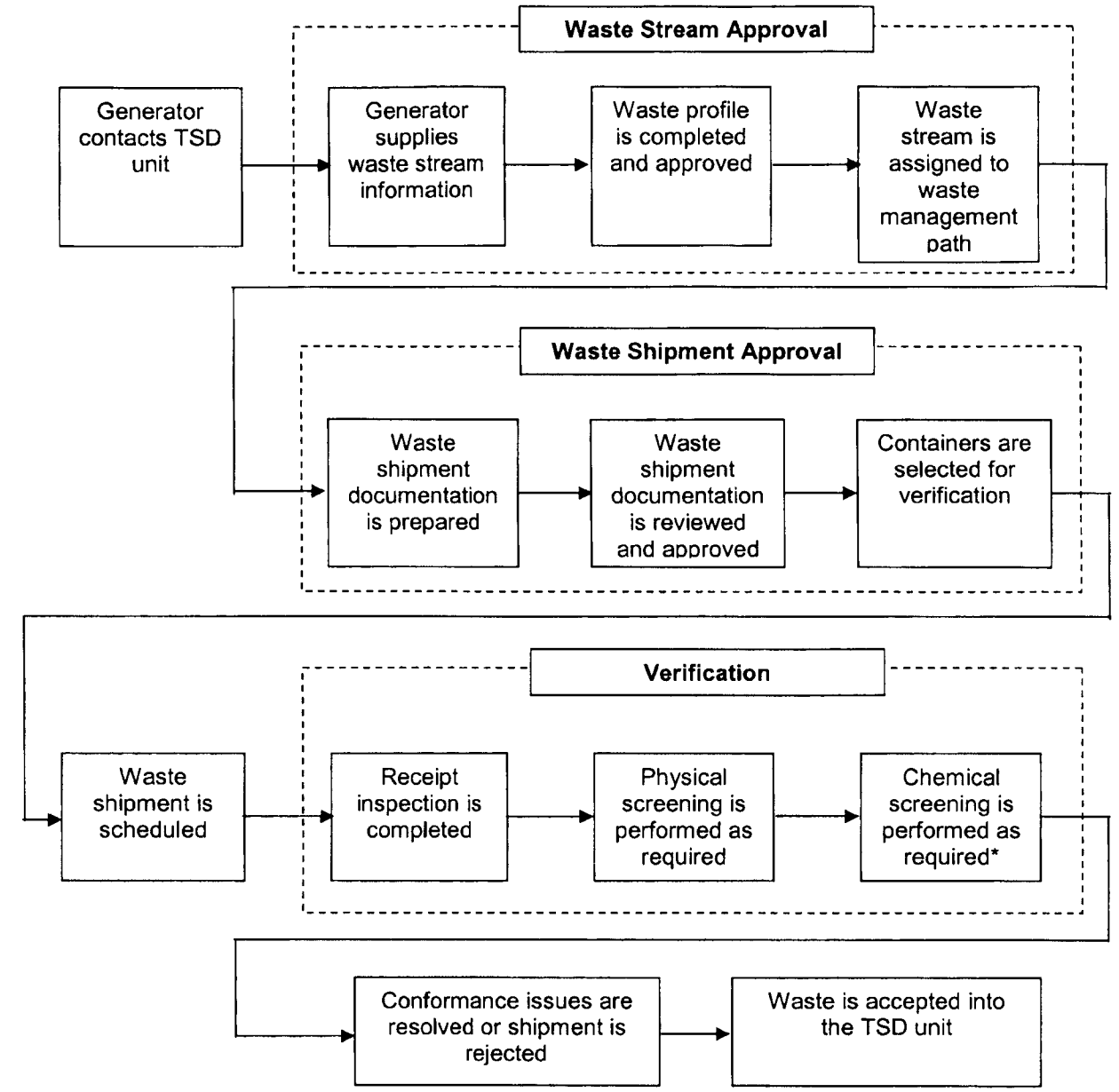

Figure 1-2. Waste Confirmation and Acceptance Process for Newly Generated Waste.

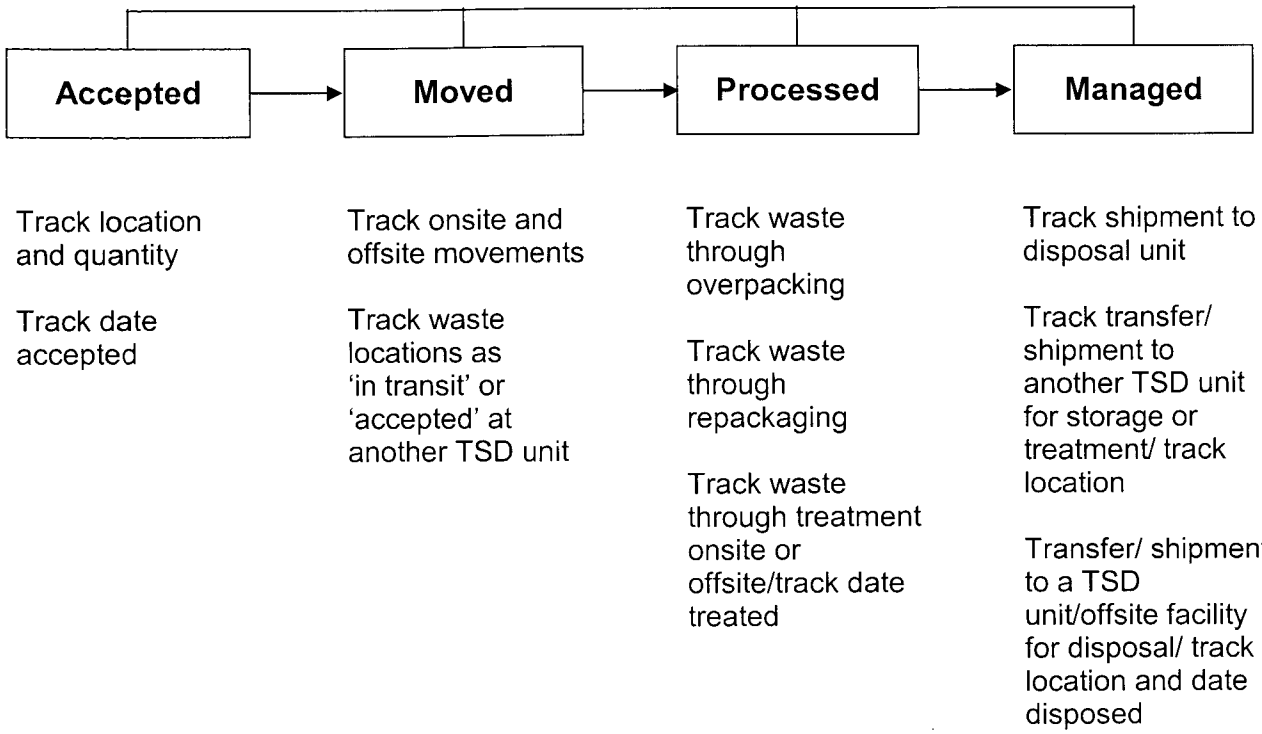

Figure 1-3. Waste Tracking.

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2.0 CONFIRMATION PROCESS

The confirmation process used to meet WAC 173-303-300 requirements includes completing appropriate pre-shipment reviews and verification steps and/or parameters as described in this section and indicated on Figure 2-1. The confirmation process for onsite generators and offsite generators is detailed in Section 2.1 and 2.2 for SWOC-generated waste is detailed in Section 2.8, WRP waste is detailed in Section 2.7 and for WRAP -generated waste is detailed in Section 2.8.

2.1 Pre-Shipment Review

Pre-shipment review takes place before waste can be scheduled for transfer or shipment to WRAP. The review focuses on whether the waste stream is defined accurately, meets the WRAP waste acceptance criteria, and the LDR status is determined correctly (for mixed waste subject to LDR treatment standards refer to Section 7.3.1). Only waste determined to be acceptable for storage and/or treatment is scheduled. This determination is based on the information provided by the generator. The pre-shipment review consists of the waste stream approval and waste shipment approval process. The following sections discuss the pre-shipment review process. The information obtained from the generator during the pre-shipment review, at a minimum, includes all information necessary to safely store and/or treat the waste. The pre-shipment review ensures the waste has been characterized for purposes of evaluation against the WRAP waste acceptance criteria, and that the data provided qualify as 'knowledge' (Section 2.1.3).

2.1.1 Waste Stream Approval Process

The waste stream approval process consists of reviewing waste stream information supplied on a waste stream profile or other approved processes and attached analysis. At a minimum, the waste stream profile or other approved processes requests the following information:

- Generator information (e.g., name, address, point-of-contact, telephone number)
- Waste stream name
- Waste generating process description
- Chemical characterization information (e.g., characterization method(s), chemicals present, concentration ranges)
- Designation information
- For mixed and dangerous waste (WRP waste is excluded) LDR information including identification of underlying hazardous constituents (UHCs) if applicable
- Waste type information (e.g., physical state, absorbents used, inert materials, stabilizing agents used)
- Packaging information (e.g., container type, maximum weight, size)
- Attachments could consist of container drawings, process flow information, analytical data, etc.

This information is reviewed against the WRAP waste acceptance criteria to ensure the waste is acceptable for receipt. If conformance issues are found during this review, additional information is requested that

could include analytical data or a sample to be analyzed. If the waste cannot be received, the WRAP will pursue acceptance of the waste at an alternative TSD unit or request the generator to pursue acceptance at an offsite facility or another approved facility.

On determination that the waste is acceptable for receipt at the WRAP, the WRAP assigns the waste on the profile or other approved processes to a waste management path and establishes a waste verification frequency based on the PES requirements found in Sections 1.1.1.3 and 2.2.3.1.

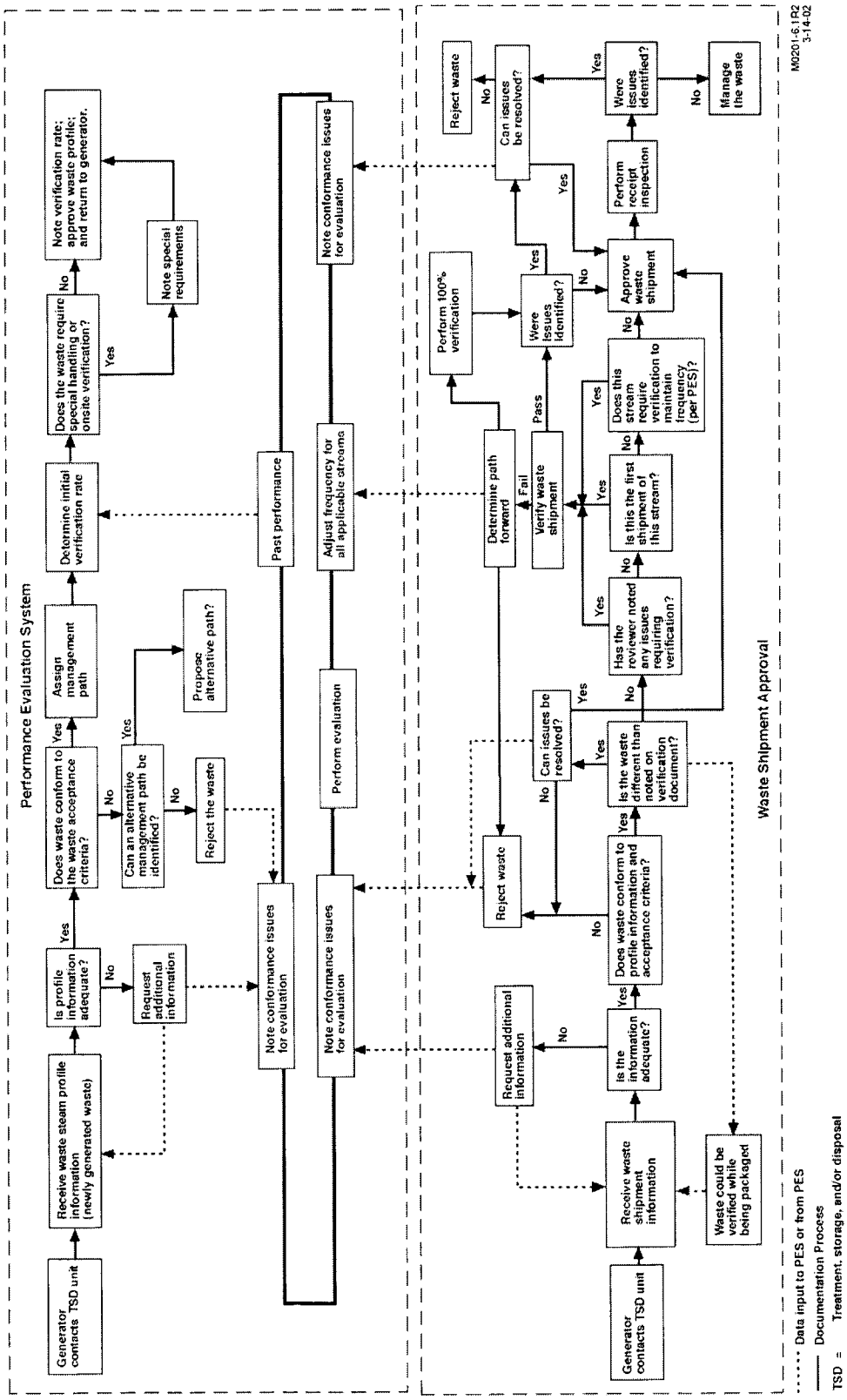

Figure 2-1. Waste Acceptance Process.

2.1.2 Waste Shipment Approval Process

For each waste transfer or shipment that is a candidate for storage and/or treatment, the generator provides the following information:

- Container identification number
- Profile number or other approved processes (except for waste transfers of previously accepted waste)
- Waste description
- Generator information (e.g., name, address, point-of-contact, telephone number)
- Container information (e.g., type, size, weight)
- Waste numbers
- Designation as extremely hazardous waste or dangerous waste
- Waste composition
- Packaging materials and quantities.

The pertinent information is entered into a solid waste information tracking system.

Where potential conformance issues exist in the information provided, (e.g., waste characteristics do not match the waste profile information, WRAP waste acceptance criteria, or additional constituents are expected to be present that do not appear on the documentation), the generator is contacted (if available) by the WRAP for resolution. Refer to Section 6.0 for discussion on repeat and review frequency.

For each container, a technical review is performed. WRP waste containers will follow an approved process (Section 2.7). Other reviews such as physical screening determination and chemical screening determination are defined in Section 2.2.2 and 2.2.3. Technical review is as follows:

- **Technical review.** The individual container data are compared to the waste profile or other approved process data to ensure the waste to be shipped to the WRAP is as described by the waste profile. Every transfer is reviewed to ensure the waste meets the WRAP waste acceptance criteria.

  Based on waste identification information provided, the waste designation is reviewed to ensure compliance with waste designations per WAC 173-303-070 through -100, as well as evaluating whether the waste meets the WRAP waste acceptance criteria.

  If the transfer or shipment information is found to be acceptable, the WRAP determines if any of the waste containers will be physically or chemically screened. WRP waste will be physically and/or chemically screened as determined by the WRP Program.

2.1.3 Knowledge Requirements

The WRAP ensures that all information used to make waste management decisions will be based on the requirements found in the following sections. Information determined to be 'knowledge' must meet the definition of 'knowledge' provided by WAC 173-303-040.

2.1.3.1 General Knowledge Requirements

Adequate knowledge requires (1) general waste knowledge requirements, (2) LDR waste knowledge requirements, and/or (3) waste knowledge exceptions.

(1) **General Waste Knowledge Requirements for Designation and Waste Management**. At a minimum, the generator supplies enough information for the waste to be treated and/or stored at WRAP. The minimum level of knowledge consists of designation data where the constituents or knowledge of the waste's generating source (in the case of wastes potentially from listed sources) causing a dangerous waste number to be assigned are quantified, and that data addresses any WRAP operational parameters necessary for proper management of the waste.

When process knowledge indicates that constituents, which if present in the waste might cause the waste to be regulated, are input to a process but not expected to be in the waste, sampling and analysis can be performed to ensure the constituents do not appear in the waste above applicable regulatory levels. This requirement can be met through chemical screening. This sampling and analysis is required only for initial characterization of the waste stream.

When the available information does not qualify as knowledge or is not sufficient to characterize a waste for management, the sampling and testing methods outlined in WAC 173-303-110 are used to determine whether a waste designates as ignitable, corrosive, reactive, and/or toxic, and the sampling and testing methods will be used as applicable to determine whether the waste contains free liquids. If the analysis is performed to complete characterization after acceptance of the waste by the WRAP, then this WAP governs the sampling and testing requirements.

(2) **Waste Knowledge Requirements for LDR Compliance.** Waste is stored at the WRAP while awaiting analytical results for LDR requirements. The WRAP portion of the operating record contains all information required to document that the appropriate treatment standards have been met or the treatment required to meet the LDR treatment standards, unless otherwise specified in this section.

For the purposes of this WAP, a representative sample is required to demonstrate compliance with a concentration-based treatment standard (refer to Section 4.0). Corroborative testing for the sample could be accomplished in the following manner.

- Generators could use onsite laboratories or other laboratories to obtain data that could be used as basis to certify that the waste meets concentration-based LDR treatment standards. For waste that must meet method based LDR treatment standards, information must be supplied on the treatment methods necessary to meet LDR requirements and comply with WAC 173-303-380(1)(j),-(k),-(n), and -(o).

- The WRAP uses these analytical data to meet applicable requirements found in WAC 173-303-140(4).

(3) **Waste Knowledge Exceptions**. The WRAP is designed to provide information necessary to further disposition the waste (e.g., repackage, designate, segregate, sample, and analyze). The WRAP shall ensure sufficient information is available (D001, D002, D003, and incompatibility) and operation safeguards are in place to safely process waste. If sufficient information is not available, the waste will enter the discrepant container management process described in Section 2.5 in order to obtain the necessary information.

2.1.3.2 Methodology to Ensure Compliance with Land Disposal Restrictions Requirements for Mixed and Dangerous Waste

All generators of mixed and dangerous waste are subject to LDR requirements and are required to submit all information notifications and certifications described in WAC 173-303-380(1)(j),-(k),-(n), and -(o).

Mixed and dangerous waste not meeting the treatment standards, but meeting the WRAP waste acceptance criteria, can be stored at the WRAP (refer to Section 1.1.1.1). The following are general requirements for offsite notifications or onsite information and supporting documentation.

- The waste is subject to LDR and the generator has treated the waste. The generator supplies the appropriate LDR certification information (WAC 173-303-140).

- The waste is subject to LDR and the generator has determined that the waste meets the LDR for disposal. The generator develops the certification based on process knowledge and/or analytical data and supplies the appropriate LDR certification information necessary to demonstrate compliance with the LDR treatment standards of WAC 173-303-140. State-only LDRs do not require this type of certification.

- The waste is subject to LDR and requires further treatment to meet applicable treatment standard.
  - The generator supplies additional information concerning the waste and details any treatment necessary to meet applicable treatment standards.
  - If waste is treated to meet state-only or federal LDRs at the WRAP, the WRAP prepares information necessary to meet WAC 173-303-380(1)(k) (refer to Section 7.3).

A representative sample of the waste must be submitted for analysis to ensure that concentration-based LDR treatment standards are met. This sample could be taken by the WRAP or the generator, and is required to comply with the treatment standards contained in 40 CFR 268.40 and 268.48 for UHCs.

2.2 Verification

Verification is an assessment performed by the WRAP to substantiate that the waste stream received at the WRAP is the same as represented by the analysis supplied by the generator for the pre-shipment review. Verification is performed on waste received by the WRAP. Verification includes container receipt and inspection. In addition, select containers could be subject to physical screening, and chemical screening. Waste is not accepted by the WRAP for storage and/or treatment until the required elements of verification have been completed, including evaluation of any data obtained from verification activities. Documentation reviewed as part of verification activities could include manifest or onsite shipment document, container inventory documentation, a container listing report, visual verification records, screening analyses, and the waste profile.

All conformance issues identified during the verification process are resolved in accordance with Section 1.1.1.3.3.

Containers previously used to hold non-acute dangerous waste will be evaluated to determine if they are empty by using the following criteria: A container or inner liner is "empty" when all wastes in it have been taken out that can be removed using practices commonly employed to remove materials from that type of container or inner liner (e.g., pouring, pumping, aspirating, etc.) and, no more than one inch of waste remains at the bottom of the container or inner liner, or the volume of waste remaining in the container or inner liner is equal to three percent or less of the container's total capacity, or, if the container's total capacity is greater than one hundred ten gallons, the volume of waste remaining in the container or inner liner is no more than 0.3 percent of the container's total capacity.

The presence of free liquids which readily separate from the solid waste portion of dangerous waste may be determined by either the paint filter test or through NDE results.

2.2.1 Container Receipt Inspection

Container receipt inspection is a mandatory element of the verification process. Therefore, 100 percent of each shipment (including onsite transfers) is inspected at the WRAP for possible damage or leaks, complete labeling, and if present, tamper-resistant seals are intact (Sections 2.2.2 and 2.2.3). This is to ensure that the shipment: (1) is received at the WRAP in good condition, (2) is the waste indicated on the transfer or shipping papers, (3) has not been opened after physical and/or chemical screening was performed, and (4) is complete. When a conformance issue exists, a case-by-case determination is performed and the appropriate action is taken based on the severity of the issue. One of the following actions may be taken as appropriate, in response to a conformance issue:

- Implementation of the contingency plan (DOE/RL-94-02) per the *Building Emergency Plan for WRAP* (HNF-IP-0263-WRAP).

- Conformance issues where additional information is needed to safely manage the waste are resolved before verification continues.

- Continuation of verification for waste with conformance issues not meeting the above criteria.

2.2.2 Physical Screening Process

Physical screening is used as a verification element. This section describes the requirement pertaining to methods, frequency, and exceptions concerning the use of physical screening as a verification activity. Physical screening could be performed before the waste is shipped to the WRAP. When physical screening is performed at a location not within the SWOC TSD units, tamper-resistant seals are applied to each container when examined. Upon receipt at the WRAP, tamper-resistant seals are verified as intact to ensure that no changes could have occurred to the waste content. The requirements for adding and/or removing tamper-resistant seals are maintained through an established program. Documentation shall be maintained in the WRAP operating record.

Selection and interpretation of the appropriate physical screening method(s) are conducted by personnel who are trained as required by the *WRAP Dangerous Waste Training Plan* (HNF-1275). Each physical screening method is performed by trained personnel according to *WRAP Dangerous Waste Training Plan* (HNF-1275).

2.2.2.1 Physical and Chemical Screening Determination

Processes must be maintained describing the activities for selecting containers for physical/chemical screening. Authoritative/directive means of selecting containers for physical/chemical screening are used based on the pre-shipment and/or waste stream review process. The selection is based on the contents listed in the associated shipment/waste stream documentation, the variation within and experience with the specific waste type.

Two criteria are used in making the selection. The first criterion is based on whether pre-shipment review activities (document and characterization review) identify areas of potential concern. The second criterion is reviewing the current physical screening percentage (calculated according to Section 2.2.2.3) of containers offered for receipt from said waste stream from said generator that have been offered over the past 12 months or the date of the last physical screening adjustment, whichever occurs last. The rate will be applied as compared to those that have been physically screened. This criterion ensures that the minimum physical screening rates required by this WAP are met.

The number of containers selected for physical screening per waste stream is determined by comparing the calculated percentage rate which is then adjusted according to the PES. This selected group of containers constitutes a sample set.

On determining whether the waste container(s) will be verified, the container(s) is scheduled for shipment.

2.2.2.2 Physical Screening Methods

The following physical screening methods, comply with the requirement to verify a waste.

1. Visual inspection (opening the container)
2. NDE.

Refer to Section 2.2.5 for QC pertaining to physical screening. (Refer to Section 3.1 for the criteria and rationale for choosing a physical screening method.)

Waste packaging that is witnessed by the WRAP or its representative at a non-SWOC location is considered to have met the physical screening requirements denoted in this WAP, provided that the program meets the requirements of WAC 173-303 and the witness is qualified to determine the waste meets acceptance requirements. On closure of the container, tamper-resistant seals must be applied to ensure the integrity of the contents.

2.2.2.3 Physical Screening Frequency

The minimum physical screening frequency is 5 percent for onsite generators, applied per waste stream per generator per year. For offsite generators, the minimum physical screening frequency is 10 percent per waste stream per generator per year. The WRAP adjusts the physical screening frequency for generators based on objective performance criteria (refer to Section 1.1.1.3.1).

If a container fails verification, the waste stream physical screening frequency will be raised to 100 percent with the next containers offered. Subsequent containers offered will be evaluated through the PES for verification rates, as described in Section 1.1.1.3 of this WAP.

2.2.2.4 Physical Screening Exceptions

The following are exceptions to the physical screening process outlined previously.

- Shielded, classified, and remote-handled mixed waste are not required to be physically screened; however, the WRAP performs a more rigorous documentation review and obtains the raw data used to characterize the waste (less than 1 percent of current waste receipts). For classified waste, it is necessary to have an appropriate U.S. Department of Energy security clearance and a need to know the information as defined by the classifying organization or agency.

- Waste that physically cannot be screened at the WRAP or an associated screening facility must be physically screened at the generator location [e.g., large components, containers that can not be opened, for as low as reasonably achievable (ALARA) purposes, or does not fit into a NDE unit]. Physical screening at the generator location consists of observing the packaging of the waste. If no location can be found to perform the physical screening, no screening is required.

- Waste that is packaged by a trained WRAP -delegated representative(s) is considered to have met the physical screening requirements as denoted within this WAP.

- Waste that has been packaged and physically screened at a SWOC TSD unit.

2.2.3 Chemical Screening Process

Chemical screening is used as a verification element. This section describes methods, frequency, and exceptions for chemical screening. Chemical screening could be performed before the waste is shipped to the WRAP. When screening is performed at a location not within the SWOC TSD units, tamper-resistant seals are applied to each container examined and, on receipt at WRAP, verified as acceptable to ensure that no changes could have occurred to the waste content. Processes are maintained by the WRAP detailing the requirements for adding and/or removing tamper-resistant seals. Documentation shall be maintained in the WRAP operating record.

Qualified personnel conduct selection and interpretation of chemical screening methods. Unless otherwise noted, tests are qualitative, not quantitative. The objective of screening is to obtain reasonable assurance that the waste generally consistent with the description on the shipping documentation. The following tests are selected depending on the waste matrix and the applicability of the method.

- pH
- Peroxide
- Oxidizer
- Water reactivity
- HOC (chlor-n-oil/water/soil)
- Headspace
- Sulfide
- Cyanide
- Paint filter.

Refer to Section 2.2.5 for QC information for chemical screening. Processes are maintained by the WRAP that define the basis for selecting screening tests.

2.2.3.1 Chemical Screening Frequency

At a minimum, 10 percent of the mixed or dangerous waste containers verified by physical screening (Section 2.2.2) must be screened chemically. WRAP obtains a representative sample, which could be a grab sample.

Small containers of waste (labpacks), not otherwise identified in the exceptions and packaged in accordance with 40 CFR 264.316, 40 CFR 265.316, and WAC 173-303-161 are screened chemically in accordance with the chemical screening frequency of the waste stream as determined by the PES team (Section 1.1.1.3). Inner containers are segregated by physical appearance. At least one container from each group (or three containers if all are similar) are screened chemically.

2.2.3.2 Chemical Screening Exceptions

The following are cases in which chemical screening is not required.

- Small containers of waste in overpacked containers (labpacks) packaged in accordance with WAC 173 303-161 and not prohibited under LDR specified in WAC 173-303-140

- A penetration test is performed when image data generating components are changed to document system capability has not changed.

- A resolution test is performed at the beginning of a shift. A shift ends when shutdown activities are performed. A shift can be up to 24-hours.

- A radiographer is qualified per SNT-TC-IA, Level II certification of American Society of Nondestructive Testing training.

- Examination must cover 100 percent of the waste in the container.

- At minimum annually, a capability demonstration is performed on a training drum.

2.2.5.2 Chemical Screening Quality Control

The following QC elements are used when performing chemical screening.

- Appropriate sample containers and equipment are used.
  - Containers and equipment of the appropriate size that are chemically compatible with the waste and testing reagents shall be used.

- Reagent checks
  - Water that is reagent grade and from a documented source shall be used.
  - Chemicals and test kits must be labeled so that these are traceable and documented in the WRAP operating record.
  - QC checks shall be performed on each lot of test kit and associated reagents and documented in the WRAP operating record, unless a more frequent period is specified in the test kit instructions.
  - Personnel performing chemical screening are adequately trained and current qualifications/certifications are on record.

2.3 Waste Transfers Between Solid Waste Operations Complex TSD Units

Transfers from the SWOC TSD units to the WRAP may be necessary to perform verification, obtain additional knowledge to support treatment/disposal, to make the waste amenable for long-term storage, or to perform treatment. A technical review is required to ensure compliance with the WRAP waste acceptance criteria. For waste that is being transferred from the SWOC TSD units TSD units to the WRAP, the following requirements apply.

2.3.1 Waste Stream Approval Process

The waste stream must already have been approved using the process described in Section 2.1.1. Waste knowledge exceptions apply as described in Section 2.1.3.1.

For retrieval of suspect-mixed waste streams from the LLBG, sufficient information must be available to further disposition the waste. Mixed waste containers are transferred out of the LLBG to WRAP or another TSD unit and ultimately received at WRAP or another approved TSD unit for packaging and/or treatment. The amount and type of data that exists for a given waste package vary widely and depend on the documentation requirements in effect when the waste was generated. The SWOC TSD unit is required to supply specific information about the waste package contents. A technical review of the records is performed as described in Section 2.3.2 and suspect dangerous waste items are identified. Suspect mixed

or dangerous waste will be evaluated and managed for safe storage until a waste designation can be completed. Additionally, a visual inspection is performed on the containers before transfer.

2.3.2 Waste Transfer Approval Process

A technical review of documentation associated with each waste container in the shipment is performed to ensure the waste meets the WRAP waste acceptance criteria. The individual container data, inclusive of all knowledge obtained on the container is compared to the WRAP's waste acceptance requirements. If necessary, the waste management path (waste specification record) previously assigned to the waste stream is updated and re-labeling/remarking is completed before the transfer. Waste is tracked through processing at the WRAP in accordance with Section 1.1.1. When characteristics of the waste change as a result of treatment or other processing, documentation will be entered into the unit-specific operating record. As new information is obtained on the waste, the container is managed to any new requirements. Updates to container data during transfer and subsequent processing activities are reflected in solid waste information tracking system, documented, and maintained in accordance with Section 8.0.

2.3.3 Verification

For container receipt inspection, 100 percent of each transfer is inspected for damage and to ensure the waste containers are those indicated on the documentation. This activity is a mechanism for identifying any document conformance issues or damaged containers before receipt/acceptance. Conformance issues identified during receipt are managed as described in Section 2.2.1.

For physical/chemical screening, once waste has been verified, additional physical/chemical screening is not required.

2.3.4 Performance Evaluation System

The performance of the generator is evaluated and documented in accordance with the PES as described in Section 1.1.1.3. The PES is used to determine physical screening frequency and determine corrective actions for conformance issues. The performance evaluation considers all newly-generated waste accepted at SWOC TSD units.

2.4 Waste Acceptance

Initial acceptance of waste occurs only after the confirmation process described in Section 3.2.0 is complete. Conformance issues identified during the confirmation process are documented and managed in accordance with Section 1.1.1.3.3. Conformance issues that must be corrected before waste acceptance include:

- Waste does not match approved profile documentation,
- Designation, physical, and/or chemical characterization discrepancy,
- Incorrect LDR paperwork,
- Packaging discrepancy,
- Manifest discrepancies as described in WAC 173-303-370(4)(a) [for offsite shipments unless Permit Conditions II.P.2 can be utilized (Ecology 2004)].

Waste that does not meet the WRAP waste acceptance criteria can be accepted when that waste is scheduled for discrepancy resolution. The discrepancy resolution activities will be tracked to completion (refer to Section 2.5).

2.5 Discrepant Container Management

During the waste acceptance process at the WRAP or another SWOC TSD unit (e.g., T Plant, CWC, or LLBG), an issue can arise where a container will be identified with a discrepant item(s) and will be called a 'discrepant container.' When a discrepant container is identified that would affect the management of the container, the following processes will be initiated:

- Liquids discovered in nonempty containers will be placed in secondary containment that meets the requirements of WAC 173-303-630(7)(a). For combination packages[1], if the liquids are only present within inner containers and no free liquids are present in the outer container, the external container will serve as secondary containment, provided that the combination package can be managed in a manner that meets the requirements of WAC 173-303-630(7)(a) and the compatibility requirements in WAC 173-303-395(1).
- Liquids discovered in nonempty containers of waste destined for disposal at the offsite disposal facility pursuant to the Land Withdrawal Act will be managed according to Section 2.7.5.
- An evaluation will be performed to ensure the compatibility with the other materials in the container and with the outer container in accordance with WAC 173-303-395(1)(b) and will be documented in accordance with WAC 173-303-395(1)(c). Liquids not determined to be compatible with the waste contents or the container will be segregated and placed on separate spill containment.
- If adequate information is unavailable to determine the liquids constitute an imminent hazard, the container will be segregated and placed on separate spill containment and placed as a priority for discrepancy resolution.
- For waste where the generator can be contacted, the generator will be requested to provide additional information. The container will be dispositioned by either returning it to the generator (provided it can be transported safely and compliantly) or by resolving the discrepancy on the container at a SWOC TSD unit.
- For project waste an evaluation will be performed on available historical data. In addition, interviews could be performed with project points-of-contact, NDE personnel, etc.
- Based upon the evaluation of information (hazards identified) the container will be managed in a safe configuration.
- The container will be scheduled for discrepancy resolution.

2.6 Sampling and Analysis Plans

A sampling and analysis plan (SAP) can be developed outside the WAP to support characterization of waste for various projects. A SAP will provide sufficient detail to ensure that sampling personnel and the analytical laboratory correctly implement the data quality objectives (DQOs) and quality assurance project plan requirements pursuant to TPA Action Plan Section 6.5 (Ecology et al. 2003). Sampling and analysis plans can utilize existing process knowledge and/or analytical data in combination with sampling requirements as identified in the SAP to sufficiently characterize a waste stream for acceptance into a SWOC unit.

[1] A combination package is any configuration where dangerous and/or mixed wastes are confined within (inner) containers, which are in turn stored within secondary, external (outer) containers. Examples include labpacks, certain overpacks, portable spill pallets, or any container configuration that has an outer container with one or more inner containers.

2.7 Management of Waste Retrieval Project Waste within Solid Waste Operations Complex TSD Units

The WRP waste has an approved process for the management of waste. Requirements for the development of knowledge documentation for waste streams are part of the process. This WAP does not reiterate the documentation process. Instead, this WAP describes how specific aspects of the documentation process are applied. WRP waste will be managed and processed through SWOC TSD units to make ready for shipment.

The SWOC TSD unit WAPs dictate minimum requirements for waste acceptance. The types of information that can be used for physical/chemical characterization include data from analysis of the waste and knowledge of the materials and/or processes that generate the waste. If the information is sufficient to quantify constituents and characteristics as required by WRAP waste acceptance criteria and meets the definition of 'knowledge' in WAC 173-303-040, the information is considered sufficient.

Waste knowledge must be sufficient to determine the waste stream designation and manage the waste in accordance with WRAP -specific waste acceptance criteria necessary for proper management. This includes, but is not limited to, sufficient knowledge to demonstrate that the waste is not prohibited from management, to segregate waste containers for compatibility, to ensure compatibility of waste within containers, to ensure that the waste can be safely managed, and to segregate waste for treatment, storage and/or disposal. The minimum level of knowledge consists of designation data where the constituents causing a dangerous waste code to be assigned are quantified. This data provides knowledge that addresses any operational parameters necessary for proper management of the waste. When process knowledge indicates constituents are present that cause the waste to be regulated, applicable waste codes are then applied. Characterization can consist of chemical screening and/or sampling as appropriate.

Analytical data and/or knowledge of the waste must be sufficient to determine whether the waste is regulated under 40 CFR 761 and/or WAC 173-303, and to assign correct waste codes. Knowledge must be sufficient to reliably substitute for direct testing of the waste. Knowledge of the waste generating process alone is used to determine whether a waste stream is a listed waste identified in WAC 173-303-080 through WAC 173-303-082. For other waste numbers and for classification under 40 CFR 761, if the available process knowledge is not sufficient to determine whether the waste is regulated and to assign waste numbers, analysis of a representative sample can be performed. The sampling and testing methods outlined in WAC 173-303-110 or other approved methods must be used for the toxicity characteristics, corrosivity, and free liquids. For other characteristic and state criteria designations, when testing is needed, an appropriate method must be used. Appropriate test methods can include SW-846 or test methods which meet or exceed the quality assurance and quality control limits as written in the latest version of SW-846. The test method must be able to meet detection and quantitation limits which are below required regulatory action limits.

Pre-shipment review takes place before waste can be scheduled for transfer or shipment to WRAP. The review focuses on whether the waste stream is defined accurately, meets the WRAP waste acceptance criteria, and the LDR status for mixed and dangerous waste (for WRP waste refer to Section 2.7) is determined correctly. Only waste determined to be acceptable for treatment and/or storage is scheduled. This determination is based on the information provided by the generator. The pre-shipment review consists of the waste stream approval and waste shipment approval process. The following sections discuss the pre-shipment review process. The pre-shipment review ensures the waste has been characterized and the data provided qualify as 'knowledge' (refer to Section 2.1.3).

2.7.1 Waste Stream Approval Process for WRP Waste

The waste stream approval process consists of reviewing stream information supplied on a knowledge document and attached analysis (if available). At a minimum, the knowledge documentation or other approved processes requests the following information:

- Generator information (e.g., name, address, point-of-contact, telephone number)
- Waste stream name
- Waste generating process description
- Chemical characterization information (e.g., characterization method(s), chemicals present, concentration ranges)
- Designation information
- Waste type information (e.g., physical state, absorbents used, inert materials, stabilizing agents used)
- Packaging information (e.g., container type, maximum weight, size)
- Attachments could consist of container drawings, process flow information, analytical data, etc.

This information is developed on a waste stream basis and applied to individual containers prior to transfer. If conformance issues are found during this review, additional information is requested that could include analytical data or a sample to be analyzed. If the waste cannot be received, the WRAP pursues acceptance of the waste at an alternative TSD unit or request the generator to pursue acceptance at an offsite facility or another approved facility.

2.7.2 Receipt of WRP Waste

For container receipt inspection of WRP waste sections are conducted in accordance with Section 2.2.1.

2.7.3 Physical Screening of WRP Waste

Physical screening using NDE described in Section 2.2.2.2 will be used but not as a condition of acceptance into WRAP.

2.7.4 Chemical Screening of WRP Waste

Chemical screening will be used to resolve discrepancies under Section 2.5; however chemical screening is not used to accept this waste into WRAP.

2.7.5 Evaluation of WRP containers with Residual Liquids Destined for Disposal at the Offsite Disposal Facility

The presence of other liquids in WRP waste containers or inner liners destined for disposal at the offsite disposal facility, which readily separate from the non-liquid portion of dangerous waste may be determined by either the paint filter test or through nondestructive examination results. When using nondestructive examination results, containers of WRP waste destined for disposal at the offsite disposal facility found to contain free liquid may be stored without separate spill containment provided that:

- Internal containers or liners contain less than 1 inch or 2.5 centimeters of liquid in the bottom of the container or liner

- Total residual liquid in any payload container (e.g., 55-gallon drum or standard waste box) will be less than 1 percent of the volume of that container

- Daily visual inspections of such containers are conducted.

2.8 Generated Waste

Waste generated by WRAP is considered accepted at WRAP when the waste is generated. Knowledge concerning the generated waste will be entered into the WRAP operating record.

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3.0 SELECTING WASTE ANALYSIS PARAMETERS

Physical/chemical screening parameters for verification must be chosen from those in Sections 3.1 and 3.2. Parameters for waste designation and to meet LDR requirements are addressed in Section 3.3. Each physical/chemical screening result must be in agreement with the shipping documentation to determine the acceptability of the result. Conformance issues identified during the confirmation process are documented and managed in accordance with Section 1.1.1.3. Parameters, methods, and rationale for physical/chemical screening parameters are provided in Table 3-1.

Table 3-1. Parameters and Rationale for Physical and Chemical Screening.

Parameter	Method[a]	Rationale for Selection
Physical Screening		
Visual inspection	Field method – observe phases, presence of solids in waste	Confirm consistency between waste and shipping documentation.
Nondestructive evaluation	Field method	Confirm consistency between waste and shipping documentation.
Chemical Screening		
Ignitability and/or headspace volatile organic compound screening	Organic vapor monitor, colorimetric gas sampling tubes, or a lower explosive level meter	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Peroxide	Field peroxide test paper	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Liquids	SW-846, Method 9095, Paint Filter Liquids Test	Confirm consistency between waste and shipping documentation.
pH	Field pH screen (pH paper method)	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Oxidizer	Field potassium iodide test paper	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Water reactivity	Field water mix screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Cyanides	Field cyanide screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Sulfides	Field sulfide screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Halogenated Organic Carbons	Screening test method for PCBs in transformer oil (SW-846, Method 9079)	Confirm consistency between waste and shipping documentation.

[a] Processes based on manufacturer's recommended methodology for test kit or testing equipment, unless otherwise noted. When regulations require a specific method, the method shall be followed.

3.1 Physical Screening Parameters

The following methods are approved for use in performing physical screening.

(1) Visual inspection (preferred method for physical screening):

Rationale. This method meets the requirement to ensure consistency between waste containers and the accompanying waste stream documentation.

Method: The container is opened and the contents are removed as needed for visual examination. Homogenous loose solids are probed to determine the presence of material not documented on the waste stream documentation, or for improperly absorbed liquids. Visual observations are compared with the applicable profile information and the container specific information in the waste stream documentation.

Failure criteria: A container fails inspection for any of the following reasons; (a) undocumented, improperly packaged, or inadequately absorbed liquids; (b) discovery of prohibited articles or materials listed in Section 1.2; (c) discovery of material not consistent with the applicable waste stream documentation ; and (d) variability greater than 25 percent by volume in listed constituents (e.g., paper, plastic, cloth, metal).

(2) NDE:

Rationale. This method meets the requirement to ensure consistency between waste containers and the accompanying waste stream documentation. This method also is subject to the QA requirements listed in Section 2.2.5. Containers that are not easily amenable to visual inspection because of physical or radiological content, or facility availability can be examined safely and economically.

Method: The container is scanned with a NDE system. Data are observed on a video monitor and captured and recorded. Personnel experienced with the interpretation of NDE imagery record their observations. These observations are compared to the contents listed on the waste stream documentation.

Failure criteria: A container fails the inspection for any of the following reasons; (a) undocumented, improperly packaged, or inadequately absorbed liquids; (b) discovery of prohibited articles listed in Section 1.2; (c) image data not consistent with the applicable waste stream documentation; and (d) variability greater than 25 percent by volume in listed constituents (e.g., paper, plastic, cloth, metal).

3.2 Chemical Screening Parameters

The following methods are approved for use in performing chemical screening tests. Chemical screening is used to verify that incoming waste is consistent with waste stream documentation. Failure of a chemical screening test is defined as a chemical screening result that is inconsistent with the associated waste stream documentation.

(1) Ignitability and/or headspace volatile organic compound screening:

Rationale: To determine the potential ignitability and the presence or absence of volatile organic compounds in waste, and to ensure that personnel are adequately protected. This method is used when containers are opened for inspection. This method can be applied to any matrix.

Method: A sample of the headspace gases in a container is analyzed by one or more of the following types of portable instrumentation: organic vapor monitor, colorimetric gas sampling tubes, or a lower explosive level meter.

Failure criteria: High organic vapor readings in matrices not documented as having volatile organic content constitutes failure.

(2) Peroxide screening:

Rationale: To determine the presence of organic peroxides in solvent wastes, to alert personnel to potential hazards, to ensure safe segregation and storage of incompatible wastes, and to confirm consistency with the waste stream documentation. The test is sensitive to low parts per million ranges.

Method: A peroxide test strip is dampened with a pipet sample of liquid waste. Solids are tested by first wetting the test strip with water and contacting a small sample of the waste. A blue color change indicates a positive reaction. The color change can be compared with a chart on the packaging to determine an approximate organic peroxide concentration.

Failure criteria: Peroxide concentrations greater than 20 parts per million in liquid waste constituents that are known organic peroxide formers not documented as having been stabilized constitutes failure. Results that are not consistent with documented constituents fails verification.

(3) Paint filter liquids test:

Rationale: To verify the presence or absence of free liquid in solid or semisolid material.

Method: To a standard paint filter, 100 cubic centimeters or 100 grams of waste are added and allowed to settle for 5 minutes. Any liquid passing through the filter signifies failure of the test. The required method for the paint filter liquids test is method 9095 in the U.S. Environmental Protection Agency (EPA), SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (the most recently promulgated version) (EPA 1986).

Failure criteria: Failure of the test in waste matrices not documented as having free liquids constitutes failure of the container. Small quantities of condensate trapped in inner plastic liner folds are acceptable.

(4) pH screen:

Rationale: To identify the pH and corrosive nature of an aqueous or solid waste, to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation.

Method: pH measurement is performed in accordance with SW-846. Processes are maintained by the WRAP and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: If the pH of a matrix exceeds regulatory limits (less than or equal to 2.0 or greater than or equal to 12.5) in waste not documented as being regulated for this property, the container fails verification.

(5) Oxidizer screen:

Rationale: To determine if a waste exhibits oxidizing properties, to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation. This test can be applied to waste liquids, solids, and semisolids.

Method: 1 or 2 drops of 3N HCl acid is added to the Oxidizer test paper (potassium iodide, starch). The test paper is touched to a pea size sample of the waste to be tested. A black, blue/black, or purple color change determines a positive oxidizer test. Processes are maintained by the WRAP and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(6) Water reactivity screen:

Rationale: To determine if the waste has the potential to vigorously react with water to form gases or other reaction products. This information is used to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation.

Method: 2 or 3 drops of distilled water is added to an oxidizer test paper strip. The test paper is touched to a pea size sample of the waste to be tested. The observance of effervescence, a violent reaction, flaming or boiling indicates a positive test. Processes are maintained by the WRAP and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(7) Cyanide screen:

Rationale: To indicate if waste could release hydrogen cyanide on acidification near pH 2. This information is used to ensure safe segregation and storage of incompatible waste and to confirm consistency with the waste stream documentation.

Method: A pea size sample of the waste to be tested is dissolved in a small quantity of water. A mixture of ferrous ammonium sulfate and ferrous ammonium citrate is added to the stoppered test tube. The sample is then shaken and 3N HCl is added to the solution. A dark Prussian blue color change indicates the presence of the acid. Processes are maintained by the WRAP and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(8) Sulfide screen:

Rationale: To indicate if the waste could release hydrogen sulfide on acidification near pH 2. This information is used to ensure safe segregation and storage of incompatible wastes and to confirm consistency with the waste stream documentation.

Method: 5 drops of 3N HCl acid is added to a pea size sample of the waste to be tested. Lead acetate test paper is touched to the sample. A brown or black color change of paper indicates a positive test. Processes are maintained by the WRAP and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(9) Halogenated Organic Carbons screen:

Rationale: To indicate whether PCBs or other chlorinated solvents are present in the waste. This information is used to confirm consistency with the waste stream documentation and to determine if additional information/data are needed to properly store and treat the waste.

Methods: Field organic chlorine tests appropriate to the matrix, such as those offered by the Dexsil Corporation (e.g., Chlor-N-Oil, Chlor-N-Soil), are used. These screening tests are available with several detection limits that enable the verification to be performed in the concentration range applicable to the proposed management path of the waste.

Failure criteria: A positive indication of chlorinated organics in a waste that is not documented as having chlorinated organic content constitutes failure.

3.3 Other Analysis Parameters

Parameters needed to meet designation, characterization, and LDR requirements for mixed and dangerous waste stored and/or treated at the WRAP are identified in Table 3-2. The most recent promulgated method for SW-846 shall be used.

In determining the characteristic of ignitability, either the Pensky-Martens (method 1010) or the Setaflash (method 1020), must be employed when testing. The characteristic of corrosivity also requires a specific test method. When testing the pH of a given waste stream, method 9040 or method 9045 must be used in accordance with WAC 173-303-090(6).

Compliance with LDR for mixed and dangerous waste that have a treatment standard expressed as constituent concentrations in wastes (CCW) (40 CFR 268.40, incorporated by reference by WAC 173-303-140) can be shown using any appropriate method. If the waste treatment standard is expressed as constituent concentrations in waste extracts (CCWE) (40 CFR 268.40, incorporated by reference by WAC 173-303-140), then the Toxicity Characteristic Leaching Procedure (TCLP) EPA SW-846 Method 1311, which is specifically referenced in 40 CFR 268.41(a), must be performed. Following that, however, any appropriate method may be used to determine concentrations of hazardous constituents in the extract and to show compliance with LDR. Both Cyanides (Total) and Cyanides (Amenable) for nonwastewaters are to be analyzed using Method 9010 or 9012, as incorporated by reference in 40 CFR 260.11. UHCs will be evaluated as required by 40 CFR 268.48.

For other parameters or methods not otherwise specified, the following are acceptable sources of testing methods (standard methods):

- Analytical methods cited in WAC 173-303.

- The most recently promulgated version of *Test Method for Evaluating Solid Waste: Physical/ Chemical Methods*, SW-846, U.S. Environmental Protection Agency, EPA, Office of Solid Waste.

- Other current U.S. EPA methods, as applicable to the matrix under evaluation.

- *Standard Methods for the Examination of Water and Wastewater, American Public Health Association* (APHA), American Water Works Association, Water Environment Federation.

- *Annual Book of ASTM Standards, American Society for Testing and Materials.*

- *AOAC Official Methods of Analysis*, AOAC (Association of Official Analytical Chemists), International.

Appropriate QA/QC documentation is required to be maintained per Section 5.0, regardless of the method used.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Waste Receiving and Processing Facility.

Parameter		Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
General chemistry					
Flashpoint		1010/1020	Liquid	To provide documentation for safe storage conditions	To determine regulatory status as D001 waste, to provide proper waste designation and applicability of LDR requirements
pH	Liquid	9040	Liquid, sludge	To indicate the degree of corrosivity for safe handling; to provide for proper waste designation; and to identify waste that might compromise container integrity	To determine regulatory status as D002 waste, to provide proper waste designation, applicability of LDR requirements and state-only requirements.
	Solid	9045	Solid		
Hydroxide		9040	Liquid	To provide documentation for safe treatment and storage conditions; and to comply with the WRAP waste acceptance criteria.	To provide proper waste designation and applicability of LDR requirements.
Water reactivity		Field method	Liquid, sludge	To determine whether the waste has a potential to violently react with water to form gases or generate heat; to provide documentation for safe treatment and/or storage conditions for waste designation; and to comply with the WRAP is waste acceptance criteria.	To provide proper waste designation; safe storage and management.
Free liquids		9095	Liquid, sludge, solid	To determine applicability of LDRs and for characterization of appropriate treatment	To determine appropriate state-only LDR status of the waste.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Waste Receiving and Processing Facility.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Cyanide	9010/9012	Liquid, sludge, solid	For safe storage; for proper waste designation; applicability of LDR; and characterization of appropriate treatment	To provide proper waste designation and applicability of LDR requirements.
Sulfide	9030	Liquid, sludge, solid	For safe storage; for proper waste designation; applicability of LDR; and characterization of appropriate treatment	To provide proper waste designation and applicability of LDR requirements.
Organic analyses				
PCBs	8082	Liquid, sludge, solid	To determine proper waste designation for management of waste in accordance with the *Toxic Substance Control Act (TSCA) of 1976* and WAC 173-303.	To provide proper waste designation and to meet TSCA and LDR requirements.
Total organic carbon	9060	Liquid, sludge, solid	To determine applicability of LDR and applicability to state-only requirements.	To provide proper waste designation and applicability to state-only requirements, to meet LDR requirements, and comply with the WRAP waste acceptance criteria.
Total organic halides	9020/9021/9022	Liquid, sludge	To determine proper waste designation and applicability to state-only requirements.	To provide proper waste designation and applicability to state-only requirements.
Persistent constituents	9075/9076/9077/ 9211/9212/9214/ 9250/9251/9253			
Total suspended solids	160.2[b]	Liquid, sludge	To determine applicability of LDR and status as a wastewater	To provide applicability of LDR and status as a wastewater.
Volatile organic compounds	1311/8260	Liquid, sludge, solid	To determine proper waste designation, applicability of LDRs, and characterization of appropriate treatment.	To provide proper waste designation, regulatory status, and applicability of LDR requirements.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Waste Receiving and Processing Facility.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Semi volatile organic compounds	1311/8270	Liquid, sludge, solid	To determine proper waste designation, applicability of LDRs, and characterization of appropriate treatment.	To provide proper waste designation, regulatory status, and applicability of LDR requirements.
Chlorinated herbicides	8151	Liquid	Not applicable	To provide proper waste designation and applicability to state-only requirements.
Inorganic analyses				
Arsenic	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Barium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Cadmium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Chromium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Lead	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Waste Receiving and Processing Facility.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Mercury	1311/7470/6020	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Silver	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Selenium	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Antimony	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.
Beryllium	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.
Nickel	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.
Thallium	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.

[a] Procedures based on EPA SW-846, unless otherwise noted. When regulations require a specific method, the method shall be followed.
[b] EPA-600/4-79/020 (EPA 1983), unless otherwise noted.
LDR = land disposal restriction.
PCB = polychlorinated biphenyls.
TSCA = *Toxic Substances Control Act of 1976*

4.0 SELECTING SAMPLING PROCESSES

Specific sampling processes and techniques depend on both the nature of the material and the type of packaging. Waste samples are handled and preserved as necessary to protect the sample. For treatment, preservation techniques, and holding times the WRAP shall utilize the processes and techniques recommended in SW-846. This section describes the sampling methodology used to obtain representative samples. DQOs have been established with Ecology in accordance with TPA Action Plan Section 6.5 (Ecology et al. 2003) and have been documented and reflected in this WAP.

4.1 Sampling Strategies

Table 4-1 contains waste forms and sample equipment used to sample referenced waste. Sampling of these waste forms is performed in accordance with Table 4-1.

4.2 Sampling Methods

Samples are processed at one of several laboratories qualified to perform analysis of waste samples (refer to Section 5.0). Sampling methods are those described in WAC 173-303 110(2) and incorporated by reference into this plan.

The basic sampling sequence includes the following:

- Obtain a unique sample number and complete the sample tag before sampling
- Obtain a precleaned sampler and sample bottles
- Attach sample label to sample bottles
- For sampling liquid waste, use a sampler or pipet to sample for two phase liquids. Homogeneous liquids in small containers will be poured into a sample bottle
- For sampling solid waste, use a scoop, trier, or hand auger to obtain a sample of the waste. For large containers of waste, composite several augers or scoops to ensure samples are representative
- Fill sample containers in the following sequence: volatile organics, semivolatile organics, metals, ignitability, pH (corrosivity)
- For solid waste, wipe the exterior surfaces of the sample bottles with a dry rag
- Attach sample labels to outer plastic bags
- Place samples in an appropriate receptacle for transfer to the laboratory
- Complete the chain-of-custody forms
- Seal and mark the receptacle in accordance with WAC 173-303-071(3)(1)
- Transfer receptacle to the analytical laboratory, as appropriate to meet sample holding times

- Properly clean and decontaminate nondisposable sampling equipment or package for return to central sampling equipment decontamination area according to onsite requirements.

4.3 Selecting Sampling Equipment

Sampling equipment selection is detailed in Table 4-1. Sampling equipment needed to sample waste is maintained and decontaminated as necessary by the WRAP to ensure representative samples according to SW-846.

4.4 Sample Preservation

Sample preservation follows SW-846 protocol; however, other approved preservation methods can be used.

4.5 Establishing Quality Assurance and Quality Control For Sampling

This WAP incorporates the requirements of Permit Condition II.E, for QA/QC. Sample collectors prepare a permanent log of sampling activities in accordance with SW-846, Chapter 9.0. Records are maintained in accordance with Section 8.0 of this WAP. Log entries include as appropriate: date of collection, time of collection, location, batch number, sample number, tank number, copy of the chain-of-custody form, sampling methodology, container description, waste matrix (liquid), description of generating process (e.g., decontamination activities), number and volume of samples, field observations, field measurements (e.g., pH, percent lower explosive limit), laboratory destination and laboratory number, and signature. These log entries are made by the appropriate personnel while the sampling is performed. The logs or copies of logs are maintained in the WRAP operating record after completion of sampling activities.

A chain-of-custody record accompanies samples at all times. The WRAP shall maintain written chain-of-custody processes to ensure accountability of waste sample handling and to ensure sample integrity. All samples are labeled with a unique identifier.

During all sampling activities, strict compliance with applicable industrial hygiene and safety standards is mandatory. Appropriate sampling and decontamination processes are used.

The following QA/QC elements are used by the WRAP to ensure sampling activities for designation purposes result in acceptable laboratory data:

- Representative sampling methods as defined by WAC 173-303-110(2); 40 CFR 261 Appendix I; and/or SW-846 Chapter 9.0
- Appropriate sample containers and equipment
- Samples numbered
- Traceable labeling system
- Field QA/QC samples (applicable SAP)
- Equipment calibration (current as appropriate)
- Chain-of-custody.

Table 4-1. WRAP Chemical Screening Sampling Equipment.

Waste form	Reference in SW-846, Chapter 9.0	
	Waste type	Equipment*
Liquids	Free-flowing liquids and slurries	COLIWASA, glass thief or pipet
Solidified liquids	Sludges	Trier, scoops and shovels
Sludges	Sludges	Trier, scoops and shovels
Soils	Sand or packed powders and granules	Auger, scoops and shovels
Absorbents	Large-grained solids	Large trier, scoops and shovels
Wet absorbents	Moist powders or granules	Trier, scoops and shovels
Process solids and salts	Moist powders or granules	Trier, scoops and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, scoops and shovels
	Large-grained solids	Large trier, scoops and shovels
Ion exchange resins	Moist powders or granules	Trier, scoops and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, scoops and shovels

COLIWASA = composite liquid waste sampler.
* other ASTM-approved equipment could be used to collect samples.

The equipment requirements of Table 4-1, as amended by any Permit conditions, apply to sampling for chemical screening. In addition, the following sampling equipment may be used in sampling for chemical screening: (1) For liquids and slurries – dip, tank, bomb, and bailer samplers, as well as tube-type samplers (e.g., thin-walled Shelby tubes, split spoons, probes); and (2) For sludges and solids – tube-type samplers and augers; for small containers, a spoon may be used in place of a scoop.

5.0 LABORATORY SELECTION AND QUALITY ASSURANCE/QUALITY CONTROL

The selection of any laboratory shall be based on the ability of the laboratory to demonstrate compliance to this section with experience and capability in the following major categories:

- Comprehensive written QA/QC program
- Technical analytical expertise
- Effective information management systems.

The QA and QC requirements outlined in this section are applicable to laboratory activities governed by this WAP.

5.1 Evaluation of Laboratories

All laboratories providing analytical support to the WRAP are required to have a current, laboratory approved QA plan. The laboratory QA plan shall be submitted to the WRAP, and if necessary to Ecology in accordance with TPA Action Plan Section 6.5 (Ecology et al. 2003), for review and acceptance before commencement of analytical work. The QA plan shall, at a minimum, address the following elements:

- Sample custody and management practices (also refer to Section 4.0)
- Sample preservation protocols
- Sample preparation and analytical process requirements
- Instrument maintenance and calibration requirements
- Internal QC measures, e.g., method blanks, spikes
- Corrective action process.

Each laboratory shall be audited periodically by an independent organization to evaluate the effective implementation of the laboratory's QA/QC program. QA personnel and a technical expert shall evaluate the laboratory through onsite observations and/or reviews of the following documentation: copies of the QA/QC documents; records of surveillances/inspections; audits; non-conformances, and corrective actions. The WRAP shall ensure independent organizations; QA personnel and technical experts are qualified to perform these evaluations.

5.2 Quality Assurance/Quality Control Objectives

The overriding goal of the analytical program is to support the accurate designation of waste and/or demonstrate compliance to LDR standards. Laboratory QA/QC programs shall be designed to meet the following objectives.

- Minimize errors. Errors could be introduced during preparative, analytical, and/or reporting phases of work. QC program elements include analysis of samples to written and approved processes and certification of the laboratory.

- Provide information. The designation of waste relies on a combination of knowledge and data. QA/QC programs that ensures accurate, precise, reliable, and reproducible data.

Key QA program elements are designed to provide objective evidence that waste analysis methods meet the performance specifications of the WRAP. QA activities and implementation responsibilities are as follows:

- Activity based laboratory inspections. Inspections are performed by the WRAP. Inspections verify that specific guidelines, specifications, or processes for the activities are completed successfully.

- Laboratory analyses. Analyses are performed by onsite or offsite laboratories on samples of waste using written and approved processes.

- Development of inspection checklists. Checklists are required for laboratory inspections and are designed to ensure that the inspected activity is consistently addressed. Checklists are completed during the inspection to document results.

- Instrument calibration and calibration verification. These activities are performed by the laboratory and are required for ensuring data of known accuracy and precision. Calibration data are maintained and stored to ensure traceability to reported results.

5.3 Laboratory Quality Assurance/Quality Control

All analytical work shall be defined and controlled by a statement of work, work order, or other work authorizing documentation. These authorizations documents shall include QA performance requirements. Samples will be handled according to approved, written and controlled laboratory processes. The accuracy, precision, and limitations of analytical data are evaluated through QC performance.

As needed, the WRAP will conducts analyses to determine completeness of information and whether waste meets the acceptance criteria for treatment, storage, or disposal at one of the Hanford Facility TSD units or those of a chosen offsite TSD facility. Testing and analytical methods will depend on the type of analysis sought and the reason for needing the information. For parameters or methods not otherwise specified in Section 3.0, the following are acceptable sources of testing methods (standard methods).

- Analytical methods cited in WAC 173-303;

- The most recently promulgated version of *Test Method for Evaluating Solid Waste: Physical/ Chemical Methods*, SW-846, U.S. Environmental Protection Agency, EPA, Office of Solid Waste;

- Other current U.S. EPA methods, as applicable to the matrix under evaluation;

- *Standard Methods for the Examination of Water and Wastewater, American Public Health Association* (APHA), American Water Works Association, Water Environment Federation;

- *Annual Book of ASTM Standards, American Society for Testing and Materials*;

- *AOAC Official Methods of Analysis*, AOAC (Association of Official Analytical Chemists), International.

Other laboratory approved, written and controlled analytical methods, proprietary methods, and non-standard methods may be needed to develop operational and safety related information.

5.4 Data Assessment

Data used for decision making need to be scientifically sound, of known quality, and thoroughly documented. Data validation is not required; however, the WRAP is responsible to ensure that data assessment or evaluation is completed. Data are assessed to determine compliance with quality standards approved by Ecology and established by this Permit in Section 5.3 are as follows.

Precision – The overall precision shall be the agreement among the collected samples (duplicates) for the same parameters, at the same location, subjected to the same preparative and analytical techniques. Analytical precision shall be the agreement among individual test portions taken from the same sample, for the same parameters, subjected to the same preparative and analytical techniques.

Accuracy – Accuracy of the measurement system shall be evaluated by use of various kinds of QA samples, including, but not limited to, certified standards, in-house standards, and performance evaluation samples.

Representativeness – Representativeness addresses the degree to which the data accurately and precisely represent a real characterization of the waste stream, parameter variation at a sampling point, sampling conditions, and the environmental condition at the time of sampling. The issue of representativeness is addressed for the following points:

- Based on the generating process, the waste stream, and its volume, an adequate number of sampling locations are selected;
- The representativeness of selected media has been defined accurately;
- The sampling and analytical methodologies are appropriate;
- The environmental conditions at the time of sampling are documented.

Completeness – Completeness is the amount of usable data obtained from a measurement system compared to the total amount of data requested.

Comparability – Comparability is the confidence with which one data set can be compared to another. This usually is accomplished by application of statistical methods.

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6.0 SELECTING WASTE RE-EVALUATION FREQUENCIES

The waste profile and supporting data and documentation shall be re-evaluated at least annually, or more often, if the generator has informed the WRAP of a change in the waste generation process, or if waste received at the WRAP or the description on the shipping documentation does not match the waste profile. If the generator has informed the WRAP of a change in the waste generation process, the waste re-enters the waste stream approval process described in Section 2.1.1. The WRAP will evaluate verification data against the waste profile to identify any waste streams for which a change in waste generation process is suspect. If a waste stream is suspect, that waste stream will re-enter the approval process described in Section 2.1.1.

When a waste profile is re-evaluated, the WRAP could request the generator to do one or more of the following:

- Verify accuracy of current waste profile;
- Supply a new waste profile;
- Submit a sample to confirm the waste is still within the profile parameters.

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7.0 SPECIAL WASTE ANALYSIS PROCEDURAL REQUIREMENTS

This section discusses any special process requirements for receiving mixed waste at the WRAP.

7.1 Processes for Receiving Onsite and Offsite Waste

The processes for receiving waste are described in Section 2.0. In general, mixed waste received from onsite generators is managed the same as waste received from offsite generators. Differences include, but are not limited to the following: (1) physical/chemical screening frequencies for verification [minimum percentages of 5 percent for waste from onsite generators and 10 percent for waste from offsite generators (note that chemical screening frequency depends on the physical screening frequency)], (2) shipping documentation (Uniform Hazardous Waste Manifests are used for waste from offsite generators and shipping documents are used for waste from onsite generators), and (3) LDR documentation requirements for mixed or dangerous waste (notification for waste from offsite generators and equivalent information from onsite generators).

7.2 Processes for Ignitable, Reactive, and Incompatible Waste

The WRAP accepts ignitable, reactive, or incompatible waste (refer to Section 1.2). Pre-shipment review and/or chemical screening requirements in Section 2.0 are used to identify whether the waste is ignitable, reactive, or incompatible. The WRAP waste acceptance criteria identifies certain management requirements for ignitable, reactive, and incompatible waste, ensuring the waste is stored in a safe manner. Precautions are taken when ignitable, reactive, or incompatible waste is stored within the WRAP.

7.3 Provisions for Complying With Federal and State Land Disposal Restriction Requirements

State-only and federal LDR requirements restrict the land disposal of certain types of waste subject to *Resource Conservation and Recovery Act* (RCRA) *of 1976* and the *Hazardous Waste Management Act of 1976*. Waste managed on the Hanford Facility falls within the purview of these LDRs per 40 CFR 268 and WAC 173-303-140. Waste constituents that are subject to LDRs are identified in 40 CFR 268.40 and referenced by WAC 173-303-140. Waste must meet certain treatment standards, as specified in 40 CFR 268 and/or WAC 173-303-140, if the waste is to be land disposed.

Generators determine if LDRs apply to the mixed or dangerous waste based on knowledge or testing [40 CFR 268.7(a)]. Each waste is analyzed for those LDR constituents contained in the listed and characteristic waste numbers identified by the generator, including any UHC identified by 40 CFR 268.2(i), if the knowledge of the generator is not sufficient to make a determination. If the LDR waste does not meet the applicable treatment standards, the generator provides waste information with each shipment stating so in accordance with WAC 173-303-380(1)(j),-(k),-(l),-(m),-(n), or -(o). If the waste meets the LDR standards, the generator must send a certification that the waste meets the treatment standards.

7.3.1 Waste Treatment

Waste is treated to meet LDR as specified in 40 CFR 268 and WAC 173-303-140 with the exception of mixed waste designated by the Secretary of Energy for a disposal facility pursuant to the *Land Withdrawal Act*, as amended.[2] Mixed waste is treated to the applicable standards required by the disposal facility or

[2] Subject to "*State of Washington v. Bodman,*" presently on appeal before the United States Court of Appeals for the Ninth Circuit, No. 06-35227.

other applicable requirements. The WRAP potentially can partially treat or pre-treat certain waste before shipment to a permitted offsite facility that could perform full treatment of the specific waste to meet LDR treatment requirements. Waste requiring treatment other than what the WRAP can provide is repackaged, labeled, and transferred to a TSD unit for storage pending identification or development of an appropriate treatment. Prior to treatment of waste, the WRAP will have in place processes to ensure safe waste treatment as defined in Section 1.1.3 of this WAP. When characteristics of the waste are changed as a result of treatment or other processing, documentation will be entered into the unit-specific operating record. Dangerous waste is shipped to an offsite TSD for treatment.

When evaluating the treatability of certain characteristic waste, consideration must be given to any additional UHCs that might be found in certain characteristic waste. The treatment standards, for the most part, are concentration-based. When the concentration-based standards are used, the constituent concentrations for the waste must fall below those specified in 40 CFR 268.40 and/or 268.48 for UHCs and in WAC 173-303-140 for land disposal without treatment. If the concentrations exceed these limits, the waste must be treated before disposal. The alternative treatment standards for hazardous debris as specified in 40 CFR 268.45 or for contaminated soil as specified in 40 CFR 268.49, or for labpacks in 40 CFR 268.42(c) could also be used.

Treatment can consist of, deactivation (neutralization, cementing, absorption), stabilization (cementing, absorption, and encapsulation); compaction, sorting, and repackaging of waste.

Deactivation is used to remove the hazardous characteristics of the waste due to its ignitability (D001), corrosivity (D002), solid corrosive acid (WSC2), and/or reactivity (D003). Treatment techniques could include neutralization, absorption, cementing, controlled reaction with water, and macro-encapsulation.

- Neutralization is the primary method of treatment for corrosive waste that has a pH less than or equal to 2 and/or greater than or equal to 12.5. Examples of bases that could be used to neutralize acids are sodium hydroxide, calcium hydroxide, or calcium carbonate. Examples of acids that could be used to neutralize bases are hydrochloric acid and sulfuric acid.

- Absorption is the primary method of treatment for ignitable waste, which include waste that is liquid and has low total organic carbon content (less than10 percent). Absorbent material that could be used includes polyacrylates, polypropylene, superabsorbent polymer, cellulose, or other absorbent materials that meets applicable disposal requirements.

- Cementing or grouting is the primary method of treatment for ignitables consisting of metal fines or other corrosive materials. These types of waste are deactivated by mixing and binding it with an inert cementacious material.

- Encapsulation is a treatment for debris.

Stabilization methods used by the WRAP include cementing or grouting, sealing, and absorption. Particulates and/or liquid waste containing hazardous constituents could be cemented or grouted at the WRAP to meet either disposal facility waste acceptance criteria, and/or the disposal criteria of future TSD units. These types of waste are stabilized by mixing and binding the waste with an inert material. The inert material generally used is Portland cement. When dealing with some waste streams, such as sludges that might contain an inconsistent or excess liquid content, absorbent could be added to the waste to provide a drier matrix to allow identification of the proper combination of ingredients to ensure a successful stabilization effort.

Treatment of state-only extremely hazardous waste (WT01, WP01, and WP03) is performed in accordance with Revised Code of Washington (RCW) 70.105.050(2) for mixed waste and/or WAC 173-303-140(4)(a) for dangerous waste as applicable.

Waste managed at the WRAP is treated to meet either concentration-based treatment standards or technology-based standards. The alternative treatment standards for hazardous debris as specified in 40 CFR 268.45 or for contaminated soil as specified in 40 CFR 268.49 also could be used. When dealing with multiple dangerous waste numbers, both standards could apply, requiring a treatment train for ultimate compliance to LDR. In most cases, stabilization treatment is at the end of the treatment train. In some instances, as with the cementing process, treatability studies could be performed to ensure that when the waste is treated, LDR requirements are met.

Grab samples are collected on each batch of concentration-based treated waste to ensure that the treatment process was successful. For specified technologies, the WRAP operating record contains information to demonstrate the treatment process was well designed and well operated.

7.3.2 Sampling and Analytical Methods

Section 3.3 defines the parameters and methods needed to demonstrate compliance to LDR treatment standards. It is recognized that ALARA concerns may warrant modifications to the methods to ensure appropriate protection of personnel health and safety without impact to the method or sample integrity. Waste analyzed using SW-846 methods modified to address ALARA protection concerns are considered acceptable provided applicable data quality objectives can be met.

Samples of waste are transferred to the sample management area for packaging and transferred to an onsite laboratory or shipped offsite to a laboratory for analysis. Samples are collected in accordance with SW-846 and as described in Section 4.0. Storage is provided for waste containers while waiting laboratory analysis results.

7.3.3 Land Disposal Restriction Certification of Treatment

When LDR treatment has been completed and analytical results (if applicable per 40 CFR 268.40 and WAC 173-303-140) have verified the LDR treatment is successful, certification of the LDR treatment is required by the WRAP. The certification statement is prepared by the unit in accordance with 40 CFR 268.7b, d, and e. A copy of the certification is placed in the WRAP operating record.

When a LDR waste does not meet the applicable treatment standards set forth in 40 CFR 268.40 and WAC 173-303-140, or exceeds the application prohibition levels set forth in 40 CFR 268.32 or Section 3004(d) of RCRA, this information is placed in the WRAP operating record, in accordance with WAC 173-303-380(1)(k), (n), and -(o).

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8.0 RECORDKEEPING

Recordkeeping requirements applicable to this WAP are described in the *Hanford Facility RCRA Permit*, Attachment 33, General Information Portion, Table 12.1 (Ecology 2004) and this WAP.

The WRAP maintains the waste stream documentation or other approved processes, supporting documentation, and associated QA/QC data described in this WAP in accordance with the requirements in Permit Condition II.I (Ecology 2004).

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9.0 REFERENCES

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HNF-1275, *WRAP Dangerous Waste Training Plan*, latest revision, Fluor Hanford, Richland, Washington.

HNF-IP-0263-WRAP, *Building Emergency Plan for Waste Receiving and Processing Facility*, latest revision, Fluor Hanford, Richland, Washington.

NIOSH, as amended, *Registry of Toxic Effects of Chemical Substances*, U.S. Department of Health and Human Services, Public Health Service Centers for Disease Control and Prevention national Institute for Occupational Safety and Health. Available on the Internet at http://www.cdc.gov/niosh/97-119.html.

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Revision 4

Low-Level Burial Grounds Waste Analysis Plan

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

FLUOR.

P.O. Box 1000
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Approved for Public Release;
Further Dissemination Unlimited

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EXECUTIVE SUMMARY

The Low-Level Burial Grounds provides disposal, storage, and/or treatment, and confirmation of dangerous waste, and/or mixed waste from onsite generators, onsite Solid Waste Operations Complex-generated waste units, Low-Level Burial Grounds-generated waste, or offsite generators (hereafter referred to as the 'generator' unless otherwise denoted in this waste analysis plan). The Solid Waste Operations Complex treatment, storage, and/or disposal units consist of Central Waste Complex, Waste Receiving and Processing Facility, Low-Level Burial Grounds, and T Plant Complex. This waste analysis plan provides processes to obtain information on the chemical, biological, and physical characteristics of the waste managed to meet the requirements of Washington Administrative Code 173-303-300, *General Waste Analysis*.

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CONTENTS

FIGURES

TABLES

ACRONYMS

ALARA	as low as reasonably achievable
AOAC	Association of Official Analytical Chemists
APHA	American Public Health Association
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Materials
CAP	corrective action plan
CCW	constituent concentrations in waste
CCWE	constituent concentrations in waste extract
COLIWASA	composite liquid waste sampler
CFR	Code of Federal Regulations
CWC	Central Waste Complex
DOE-RL	U.S. Department of Energy, Richland Operations Office
DQO	data quality objectives
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
HNF	Hanford Nuclear Facility (document identifier)
LDR	land disposal restriction
LLBG	Low-Level Burial Grounds
MSDS	material safety data sheet
NDA	nondestructive assay
NDE	nondestructive examination
NIOSH	National Institute for Occupational Safety and Health
PCB	polychlorinated biphenyl
PES	performance evaluation system
pH	negative logarithm of the hydrogen-ion concentration
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
RCW	Revised Code of Washington
SAP	sampling and analysis plan
SWOC	Solid Waste Operations Complex
T Plant	T Plant Complex
TCLP	toxicity characteristic leaching procedure
TPA or Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSCA	*Toxic Substances Control Act of 1976*

TSD	treatment, storage, and/or disposal
UHC	underlying hazardous constituents
WAC	Washington Administrative Code
WAP	waste analysis plan
WRAP	Waste Receiving and Processing (Facility)
WRP	Waste Retrieval Project

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	Meters	3.28084	feet
yards	0.9144	meters	Meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
Mass (weight)			**Mass (weight)**		
ounces (avoir)	28.34952	grams	Grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			**Volume**		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	Liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	Liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds (force) per square inch	6.894757	Kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Third Ed., 1990, Professional Publications, Inc., Belmont, California.

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LOW-LEVEL BURIAL GROUNDS WASTE ANALYSIS PLAN

1.0 UNIT DESCRIPTION

The purpose of this waste analysis plan (WAP) is to document the waste acceptance process, sampling methodologies, analytical techniques, and overall processes that are undertaken for waste accepted for treatment, storage, and/or disposal at the Low-Level Burial Grounds (LLBG). For a detailed description of the LLBG refer to LLBG, Chapter 1.0, "Part A Form", Chapter 2.0, "Facility Description and General Provisions", Chapter 4.0, "Process Information" (DOE/RL-88-20). Activities may be performed by the LLBG operating organization or its delegated representative.

1.1 Description of Unit Processes and Activities

The LLBG are a land-based unit consisting of two burial grounds located in the 200 East Area and 200 West Area (for locations refer to Chapter 1.0, Part A). Mixed waste is and has been received from onsite generating units and from offsite generators and is and will be disposed in mixed waste trenches. Leachate collected from lined trenches in 218-W-5 Burial Ground is transferred to leachate collection tanks that are located in proximity to the lined trenches.

The 218-E-12B Burial Grounds are classified as a landfill (D81) and the 218-W-5 Burial Ground is classified as a landfill (D81), greater-than-90-day container storage (S01), and other treatment (T04). The regulated portions of the LLBG cover a total area of approximately 49 hectares.

The 218-E-12B Burial Ground is located in the 200 East Area and 218-W-5 Burial Ground is located in the 200 West Area. All mixed waste destined for disposal meets land disposal restriction (LDR) requirements (WAC 173-303-140, 40 CFR 268, and RCW-70.105) or other regulatory alternatives as described in Chapter 3.0, Waste Analysis Plan. The lined trenches (trenches 31 and 34 in the 218-W-5 Burial Ground) have leachate collection and removal systems. The leachate collection tanks are operated in accordance with the generator provisions of WAC 173-303-200.

Disposal of mixed waste in unlined trenches requires an exemption from the liner/leachate collection system requirements. This documentation includes an exemption request for trench 94 for the disposal of U.S. Navy defueled reactor compartments (refer to Chapter 4.0, Process Information).

The following provides a brief description and identifies the generic types of waste disposed in the LLBG. An electronic database is maintained that documents each waste receipt, type of waste, and disposal location.

- The 218-E-12B Burial Ground, trench 94 is approximately 68 hectares in size (Chapter 1.0) and receives reactor compartments from the U.S. Navy.

- The 218-W-5 Burial Ground, trenches 31 and 34 is approximately 37.2 hectares in size Chapter 1.0) and began receiving waste in 1986. Trenches 31 and 34 also are designated as a greater-than-90-day container storage, and treatment unit. Adjacent to the double-lined mixed waste trenches are leachate collection tanks. Examples of waste to be placed in the double-lined mixed waste trenches include mixed waste that has been treated to meet LDR requirements (including bulk waste), and macro-encapsulated long-length contaminated equipment, and mixed waste that can be treated within the trench.

1.1.1 Waste Acceptance, Movement, Processing, and Management

The LLBG uses waste tracking processes to ensure that the waste received at the LLBG matches the manifest or transfer papers, to ensure that the waste is tracked through the LLBG to final disposition, and to maintain the information required in WAC 173-303-380. Waste is tracked through processing such as segregation, repackaging, treatment, and/or intra-TSD unit transfers. The waste tracking process provides a mechanism to track waste through a uniquely identified container (refer to Figure 1-3). The unique identifier is a barcode (or equivalent) that is recorded in an electronic data tracking system. This mechanism encompasses waste acceptance, movement, processing, and management of waste. When a new container is used, identification numbers are assigned and maintained as the waste moves through LLBG. The container identification number allows the LLBG to link to hard copy or electronic copy of records that are maintained as part of the operating record to retain information on the location, quantity, and physical and chemical characteristics of the waste.

The following sections and Figure 1-1 and Figure 1-2 describe the process for waste acceptance and different types of information and knowledge reviewed/required during the acceptance process. The process for management of waste is described in Chapter 4.0.

1.1.1.1 Narrative Process Descriptions

Waste that meets applicable LDR requirements, as specified WAC 173-303-140, which incorporates by reference 40 CFR 268, is stored at the LLBG. Mixed waste that does not meet LDR requirements, as specified in 40 CFR 268 and WAC 173-303-140, is stored until the waste is processed for repackaging or further treatment at the LLBG or another approved location. The LLBG operating record contains information necessary to meet LDR requirements (Sections 2.1.3.2 and 7.3). Containerized waste that is not fully characterized or is awaiting analytical results can be stored at the LLBG as well. The Hanford Facility is required to test certain mixed wastes when treatment standards are expressed as a concentration to ensure that the waste or treatment residues are in compliance with applicable LDR requirements (Section 2.1.3.2 and 7.3). Such testing is performed according to the frequency specified in this WAP, as specified in 40 CFR 268.7(b), incorporated by reference by WAC 173-303-140.

1.1.1.2 Waste Acceptance Process

The waste acceptance process for the LLBG consists of following activities:

- Waste Stream Approval. The generator provides information concerning each waste stream on a waste profile sheet. The waste stream information is reviewed against the LLBG waste acceptance criteria. If the waste stream information is sufficient and meets the applicable acceptance criteria, the waste stream is approved. In addition, the initial verification frequency for the waste is determined in accordance with the requirements found in the performance evaluation system (PES) program (Section 1.1.1.3). For a more complete description of the waste stream approval process, refer to Section 2.1.1.

- Waste Shipment/Transfer Approval. The generator provides specific data for each waste container on the container data sheet. The container data are reviewed against the waste profile sheet data and the LLBG acceptance criteria before being approved for shipment/transfer. In addition, the LLBG determines if any of the containers require verification based on the verification frequency as determined by the PES. For a more complete description of the waste shipment/transfer approval process, refer to Section 2.1.2.

- Verification. All waste streams are subject to receipt inspection during the waste shipment acceptance process. The percentage of the waste stream selected for physical and/or chemical screening is determined in accordance with the requirements found in the PES program (Section 1.1.1.3). Containers are opened and verified visually or by NDE. Of those containers subjected to physical screening, a percentage is subject to chemical screening via field or laboratory analysis. All information and data are evaluated to confirm that the waste matches the waste profile and container data/information supplied by the generator.

1.1.1.2.1 Waste Acceptance Process Between Solid Waste Operations Complex TSD Units

Waste transfers between Solid Waste Operations Complex (SWOC) TSD units could be necessary to support Hanford Site goals. In these instances a waste stream profile, or other approved processes that already has been developed, may be used to support these activities. A container may be transferred between SWOC facilities to accommodate the verification activities. A documented review is required to ensure compliance with the LLBG waste acceptance criteria. All waste transfers and containers are subject to receipt inspection. For waste that has not been accepted at CWC, LLBG, WRAP, or T Plant Complex TSD units; physical and or chemical screening will be completed as described in Sections 3.1, 3.2, and 3.3. The individual container data, inclusive of all knowledge obtained on the waste is compared to the LLBG waste acceptance requirements. Previously accepted waste that has not been considered for verification will be verified prior to transfer between SWOC TSD units. For a more complete description of the transfer process, refer to Section 2.3.

1.1.1.2.2 Types of Knowledge

When collecting documentation on a waste stream or container, the LLBG must determine if the information provided by the generator meets the definition of knowledge in WAC 173-303-040. Knowledge requirements are met by sampling and analysis, and/or process knowledge. Process knowledge consists of detailed information from existing published or documented waste analysis data or studies on processes similar to those that generated the waste, including but not limited to the following:

- Mass balance from a controlled process that has a specified input for a specified output
- Material safety data sheets (MSDSs) on unused chemical products
- Test data from a surrogate sample
- Analytical data on the waste or a waste from a similar process.
- Interview information
- Logbooks
- Procurement records
- Qualified analytical data
- Processes and/or methods
- Process flow charts
- Inventory sheets
- Vendor information
- Mass balance from an uncontrolled process (e.g., spill cleanup)
- Mass balance from a process with variable inputs and outputs (e.g., washing/cleaning methods).

This information will be sufficient to quantify constituents and characteristics to safely manage in compliance with LLBG acceptance criteria and WAC 173-303. The LLBG acceptance criteria is defined as the requirements found in this WAP and the associated LLBG dangerous waste permit application Part A.

1.1.1.3 Description of Performance Evaluation System (PES)

The PES acting as an agent of LLBG determines the initial physical screening frequency of each waste stream. PES provides a periodic status of an individual generator's performance for waste received. PES provides a mechanism for determining corrective actions, resolving waste acceptance issues, and physical screening frequency adjustments when a conformance issue has been discovered for newly generated waste.

1.1.1.3.1 Initial Physical Screening Frequency Determination

The initial physical screening frequency is determined based on the following process.

- Personnel responsible for waste receipt at the LLBG review the generator waste profile information to determine the relative potential for misdesignation or inappropriate segregation based on all relevant information, including any previous experience with the generator. Based on this review, any concerns are identified associated with the following criteria:
  - documented waste management program
  - waste stream characterization information
  - potential for inappropriate segregation.

- Based on the identification of concerns during the review, an initial physical screening frequency is established for the new generator's waste stream based on the following criteria:
  - Initial physical screening frequency of, at a minimum, 20 percent: No concerns identified (e.g., cleanup of contaminated soil where the soil has been well characterized and no other waste generation processes are occurring at that location)
  - Initial physical screening frequency of, at a minimum, 50 percent: Concern(s) identified in one criterion
  - Initial physical screening frequency of 100 percent: Concerns identified in two or more criteria.

1.1.1.3.2 Performance Evaluation

A performance evaluation is used to trend a generator's waste acceptance performance and is used to adjust the generator's overall physical screening frequency. This evaluation, identified as an integral part of the QA program, is objective and considers the conformance issues documented during the Preshipment Review and Verification functions. The PES maintains processes that: (1) perform evaluations based on conformance issues identified, (2) evaluate unsatisfactory performance for corrective actions, and (3) adjust physical screening rates accordingly.

The performance evaluation is conducted and subsequently accepted by PES team, and the documentation maintained in accordance with Section 8.0. Performance evaluation frequency is based on the generators historical performance and the waste stream in involved.

1.1.1.3.3 Conformance Issue Resolution

Conformance issues could result in a waste container that does not meet the LLBG waste acceptance criteria. A conformance issue is any discrepancy identified during the confirmation process with waste package documentation, a waste package, or a shipment. Discrepancies can be identified during preshipment reviews of waste streams during the verification process. If a possible conformance issue is identified, the following actions are taken to resolve the issue.

- The PES compiles all information concerning the possible conformance issue(s).

- The generator is notified and requested to supply additional knowledge that may assist in the resolution of the concern(s). If the generator supplies information that resolves the concern(s) identified, no further action is required.

- On determination that a conformance issue has been identified during verification, the LLBG personnel and the generator discuss the conformance issue and identify the appropriate course of action to resolve the container in question, e.g., pick another sample set, return the container, divert the container to another TSD unit that can accept the container and resolve the issue, or the generator resolves the issue at the LLBG. If the conformance issue(s) results in a waste stream failure, the physical screening frequency for all waste streams that have the potential to exhibit a similar conformance issue from the generator are adjusted to 100 percent for the next shipment until the issue(s) can be adequately addressed.

- The LLBG requests the generator to provide a corrective action plan (CAP) that clearly states the reason for the failure and describes the actions to be completed to prevent recurrence. The generator could request a reduction in verification of unaffected streams. This request must be accompanied by a justification that identifies why this stream(s) would not exhibit the same conformance issue.

- The LLBG reviews the CAP and stream justification for adequacy. If the CAP is inadequate, the generator remains at a physical screening rate of 100 percent. If the stream justification is adequate, the LLBG could provide an alternative frequency as denoted in Section 1.1.1.3.2.

1.1.1.3.4 Process for Reducing the Physical Screening Frequency

Physical screening (Section 2.2.2) rate frequencies and changes to those frequencies could be applied to a specific waste stream, to a specific contractor, or to a specific offsite generator based on the circumstances surrounding the conformance issue. After the initial physical screening frequency for a given waste stream has been established or increased, the physical screening frequency can be reduced in accordance with the following process.

The physical screening frequency is reduced in three steps. Reduction for all steps is based on the ability to demonstrate that five containers from the waste stream in question pass verification. In addition, reduction to the minimum frequency requires that the LLBG documents an acceptable evaluation of the corrective action plan. At no time will the physical screening frequency be reduced below 5 percent for waste generated onsite or below 10 percent for offsite generators.

Step 1) Reduce frequency by up to 66 percent after five containers from the waste stream in question pass verification.

Step 2) Reduce frequency established in Step 1 by up to 50 percent or to the minimum allowable whichever results in a greater frequency after five containers from the waste stream in question pass verification.

Step 3) Reduce frequency established in Step 2 to the minimum allowable after five containers from the waste stream in question pass verification. The LLBG documents an acceptable evaluation of the corrective action plan.

The physical screening rate reduction is established during periodic PES team evaluations, and the documentation is maintained according to Section 8.0 of this WAP. The percentage of the reduction is based on the evaluation of the relative severity of the original conformance issue, the status of the

corrective action plan, any interim actions taken by the generator, the generator's performance for this waste stream before this reduction, and/or other factors deemed relevant.

1.1.2 Operating Conditions

The LLBG shall ensure that all waste management operations are conducted in accordance with design and engineering requirements of waste management structures and equipment, and with all equipment manufacture specifications and operating processes. Before treatment and/or storage of waste, the LLBG shall have processes in place to ensure safe management of the waste. These processes shall consider actual or potential risks posed by the waste and treatment and/or storage equipment. The LLBG shall conduct all waste treatment and/or storage according to these processes and comply with labeling, container management, and inspection requirements of WAC 173-303-630.

1.2 Identification and Classification of Waste

Waste is accepted for disposal (mixed waste) and/or storage (mixed and dangerous) in LLBG except for the following waste types:

- Waste is not accepted for disposal when the waste contains free-standing liquid unless all free-standing liquid:
  - Has been removed by decanting or other methods
  - Has been mixed with sorbent or stabilized (solidified) so that free-standing liquid is no longer observed
  - Has been otherwise eliminated
  - Container is very small, such as an ampoule
  - Container is a labpack and is disposed in accordance with WAC 173-303-161 or 40 CFR 264.316
  - Container is designed to hold free liquids for use other than storage, such as a battery or capacitor.

There could be cases in which small amounts of residual liquids are present in mixed waste containers because condensate has formed following packaging or free liquids remain in debris items (e.g., pumps, tubing) even after draining. When it is not practical to remove this residual liquid or impossible to sample to determine if liquids are present, the liquid must be eliminated to the maximum extent practical by draining and placing a quantity of sorbent sufficient to sorb all residual liquids in the bottom of the container or dispersed among the waste.

Free liquid is determined by SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Method*, Method 9095 (Paint Filter Liquids Test) [WAC 173-303-140(4)(b) and 40 CFR 264.314(d)] only for waste that has the potential for free liquid formation.

- Gaseous waste is not accepted for disposal if the waste is packaged at a pressure in excess of 1.5 atmospheres at 20°C.

- Pyrophoric waste is not accepted for disposal. Waste containing less than 1 weight percent pyrophoric material partially or completely dispersed in each package is not considered pyrophoric for the purposes of this requirement.

- Solid acid waste is not accepted for disposal [WAC 173-303-140(4)(c)].

- Untreated extremely hazardous waste is not accepted for disposal. Extremely hazardous waste that has been treated could be disposed and/or stored in accordance with Revised Code of Washington (RCW) 70.105.050(2), "Hazardous Waste Management".

- Untreated organic/carbonaceous waste is not accepted for disposal [WAC 173-303-140(4)(d)] except as allowed by WAC 173-303-140(4)(d)(iii).

- Waste not meeting the applicable treatment standards is not accepted for disposal [40 CFR 268 and WAC 173-303-140(4)].

- Mixed waste that is incompatible with the liner system is not accepted in this TSD unit. Table 1-2 provides a list of chemicals that have been shown to be incompatible with the liner material in concentrated form. In general, mixed waste that meets federal and state treatment standards is compatible with the TSD unit liner system. Waste streams are evaluated during pre-transfer/pre-shipment review to ensure that the waste streams do not contain constituents incompatible with the liner system in concentration sufficient to degrade the liner.

Table 1-1. Chemicals Incompatible With the High-Density Polyethylene Liner (in concentrated form).

Chemical	CAS Number
Amyl chloride	543-59-9
Aqua regia	8007-56-5
Bromic acid	15541-45-4
Bromobenzene	108-86-1
Bromoform	75-25-2
Calcium bisulfite	13780-03-5
Calcium sulfide	20548-54-3
Diethyl benzene	25340-17-4
Diethyl ether	60-29-7
Bromine	7726-95-6
Chlorine	7782-50-5
Fluorine	7782-41-4
Ethyl chloride	75-00-3
Ethylene trichloride	79-01-6
Nitrobenzene	98-95-3
Perchlorobenzene	118-74-1
Propylene dichloride	78-87-5
Sulfur trioxide	7446-11-9
Sulfuric acid (fuming)	8014-95-7
Thionyl chloride	7719-09-7
Vinylidene chloride	75-35-4

CAS = Chemical Abstracts Service

The Part A, Form 3, permit application for this TSD unit identifies dangerous waste numbers, quantities, and design capacity (DOE/RL-88-21, *Hanford Facility Dangerous Waste Part A Permit Application*).

Refer to Section 7.2 for precautions taken when ignitable, reactive, or incompatible waste is stored.

LLBG manages waste that has been treated to meet LDR. In addition to the waste received at LLBG for disposal and/or storage, mixed and dangerous waste. This waste material consists of items such as but not limited to personal protective equipment (PPE), rags, and spent equipment contaminated with dangerous cleaning agents, lubricants, paints, or other dangerous materials. Process knowledge, field screening, or sampling and analysis are used as appropriate to characterize these waste materials. Field screening and sampling are in accordance with this WAP and occur at the point of waste generation or at the location where the waste materials are stored.

Biological waste received from generators could consist of animal remains that were used for experiments. This type of waste can be analyzed using NDE or visual examination.

1.2.1 Dangerous Waste Numbers, Quantities, and Design Capacity

The LLBG Part A identifies dangerous waste numbers, quantities, and design capacity.

Waste is designated pursuant to WAC 173-303 using manufacturer's product information, MSDS, laboratory analysis, and reference material such as *Registry of Toxic Effects of Chemical Substances* (NIOSH). Waste also is characterized in accordance with the requirements of 40 CFR 761.

Designation for Waste Types Reprocessed at LLBG:

Number	References
U and P numbers	WAC 173-303-9903-9904
F numbers	WAC 173-303-9904
WPCB	WAC 173-303-9904
D001	WAC 173-303-090(5)
D002	WAC 173-303-090(6)
D003	WAC 173-303-090(7)
D004 through D043	WAC 173-303-090(8)
WT01 and WT02	WAC 173-303-100 and 104
WP01, WP02, and WP03	WAC 173-303-100 and 104
WSC2 (excluding acid)	WAC 173-303-090(6)/104

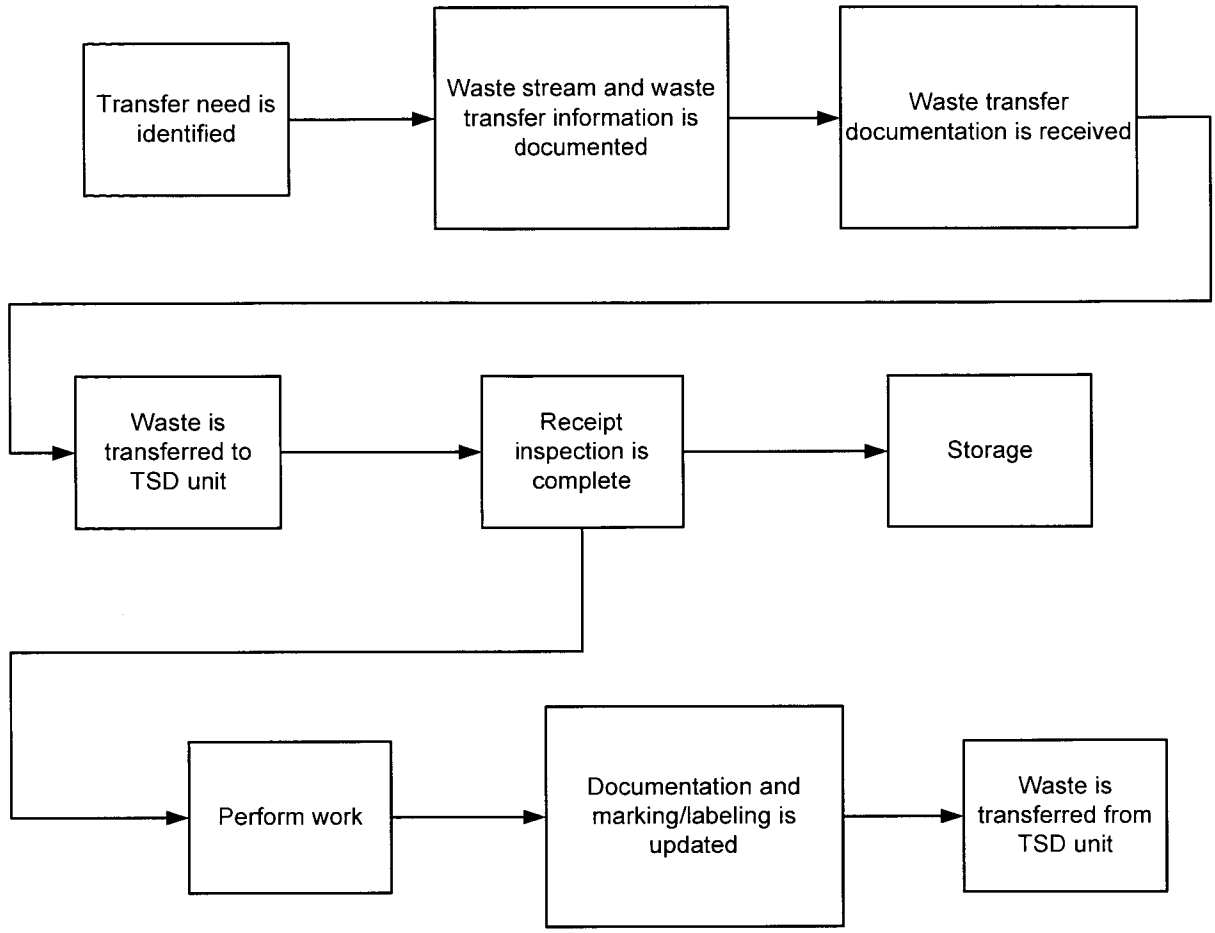

Figure 1-1. Waste Transfers Between Solid Waste Operations Complex TSD Units.

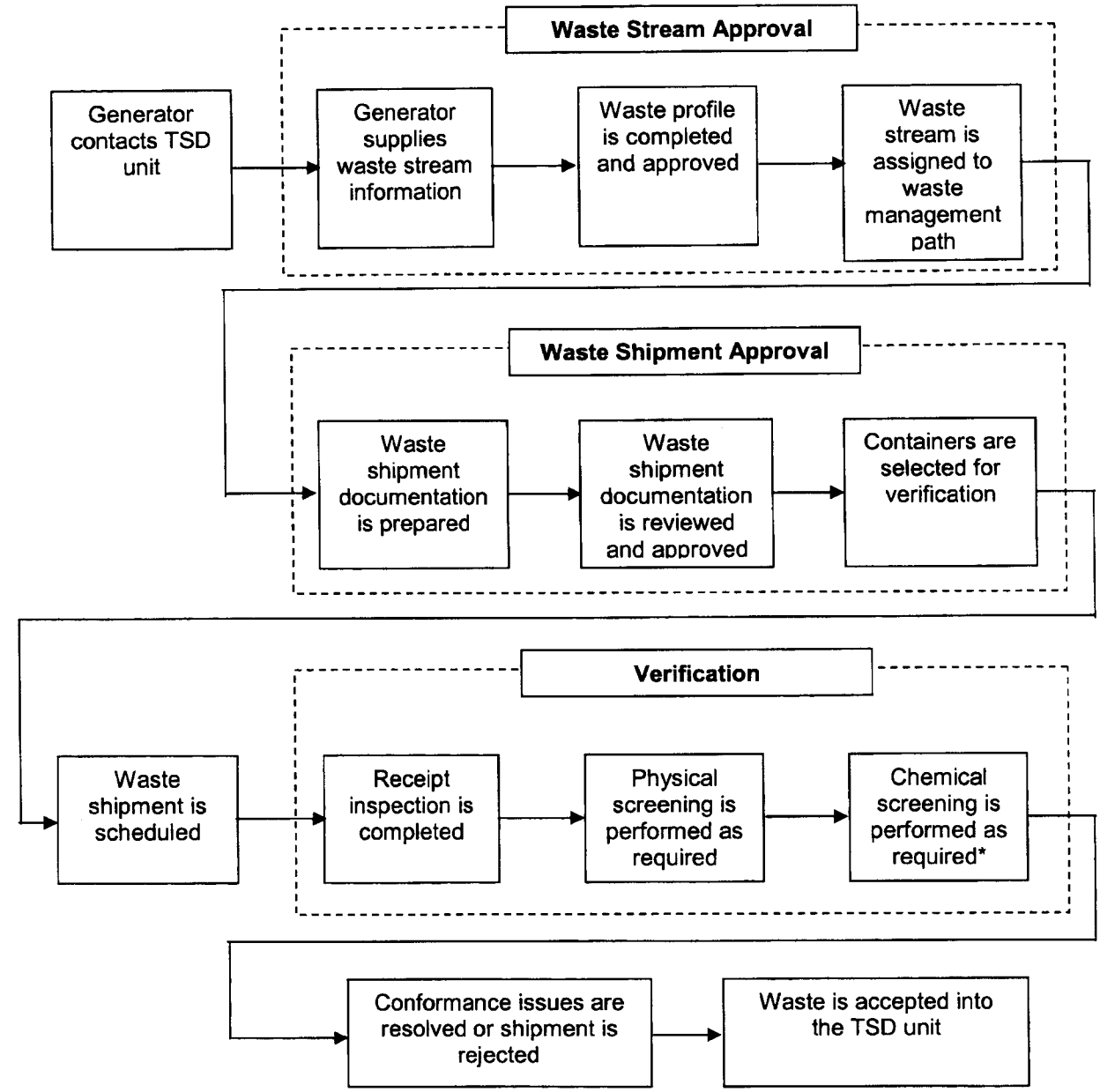

Figure 1-2. Waste Confirmation and Acceptance Process for Newly Generated Waste.

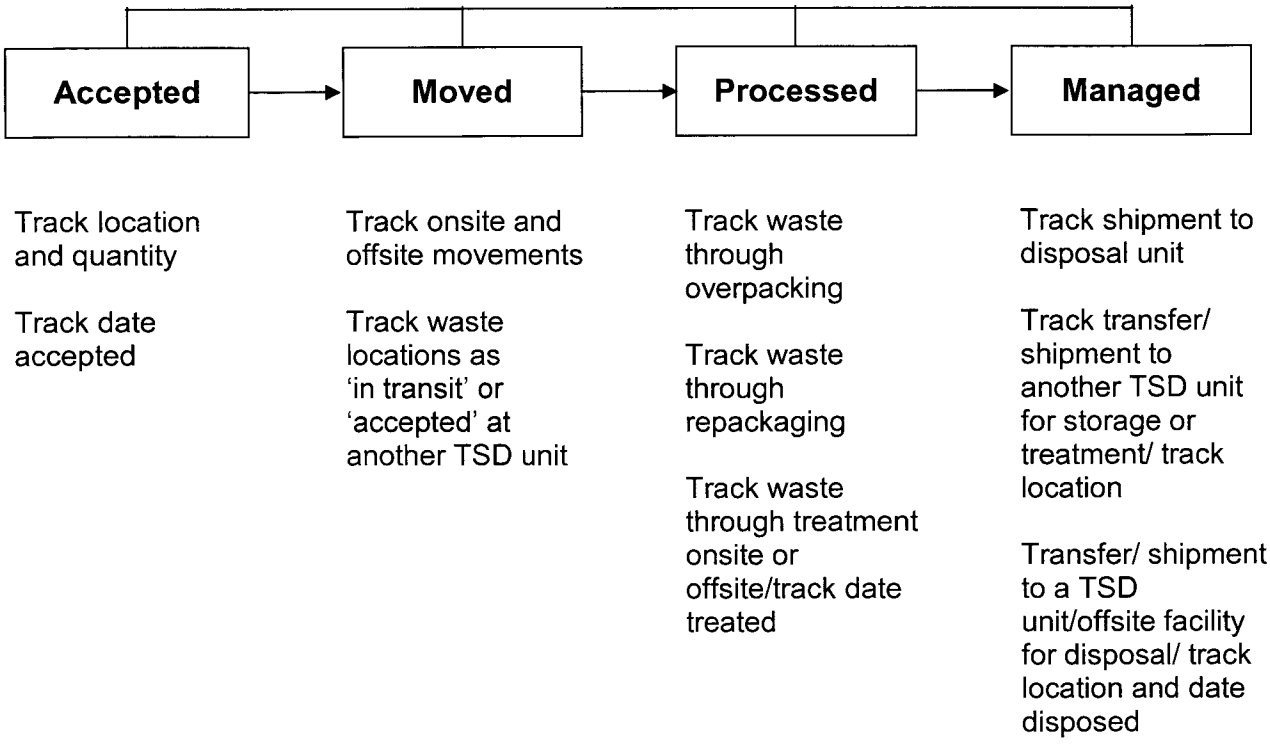

Figure 1-3. Waste Tracking.

2.0 CONFIRMATION PROCESS

The confirmation process used to meet WAC 173-303-300 requirements includes completing appropriate pre-shipment reviews and verification steps and/or parameters as described in this section and indicated on Figure 2-1. The confirmation process for onsite generators and offsite generators is detailed in Section 2.1 and 2.2 for SWOC-generated waste is detailed in Section 2.8, WRP waste is detailed in Section 2.6.1 and for LLBG-generated waste is detailed in Section 2.8.

2.1 Pre-Shipment Review

Pre-shipment review takes place before waste can be scheduled for transfer or shipment to LLBG. The review focuses on whether the waste stream is defined accurately, meets the LLBG waste acceptance criteria, and the LDR status is determined correctly (for mixed waste subject to LDR treatment standards refer to Section 7.3.1). Only waste determined to be acceptable for storage and/or treatment is scheduled. This determination is based on the information provided by the generator. The pre-shipment review consists of the waste stream approval and waste shipment approval process. The following sections discuss the pre-shipment review process. The information obtained from the generator during the pre-shipment review, at a minimum, includes all information necessary to safely store and/or treat the waste. The pre-shipment review ensures the waste has been characterized for purposes of evaluation against the LLBG waste acceptance criteria, and that the data provided qualify as 'knowledge' (Section 2.1.3).

2.1.1 Waste Stream Approval Process

The waste stream approval process consists of reviewing waste stream information supplied on a waste stream profile or other approved processes and attached analysis. At a minimum, the waste stream profile or other approved processes requests the following information:

- Generator information (e.g., name, address, point-of-contact, telephone number)
- Waste stream name
- Waste generating process description
- Chemical characterization information (e.g., characterization method(s), chemicals present, concentration ranges)
- Designation information
- For mixed and dangerous waste (WRP waste is excluded) LDR information including identification of underlying hazardous constituents (UHCs) if applicable
- Waste type information (e.g., physical state, absorbents used, inert materials, stabilizing agents used)
- Packaging information (e.g., container type, maximum weight, size)
- Attachments could consist of container drawings, process flow information, analytical data, etc.

This information is reviewed against the LLBG waste acceptance criteria to ensure the waste is acceptable for receipt. If conformance issues are found during this review, additional information is requested that

could include analytical data or a sample to be analyzed. If the waste cannot be received, the LLBG will pursue acceptance of the waste at an alternative TSD unit or request the generator to pursue acceptance at an offsite facility or another approved facility.

On determination that the waste is acceptable for receipt at the LLBG, the LLBG assigns the waste on the profile or other approved processes to a waste management path and establishes a waste verification frequency based on the PES requirements found in Sections 1.1.1.3 and 2.2.3.1.

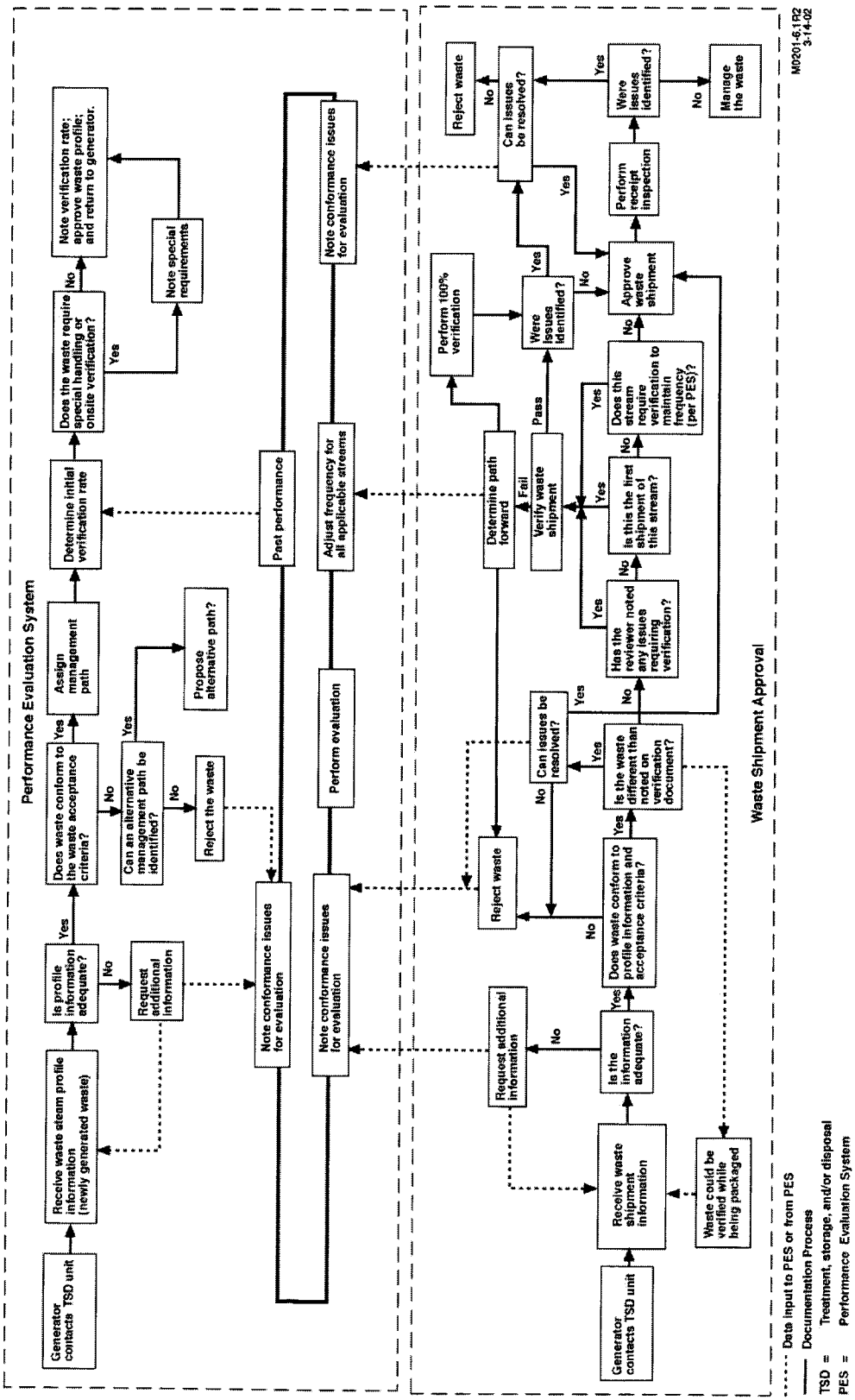

Figure 2-1. Waste Acceptance Process.

2.1.2 Waste Shipment Approval Process

For each waste transfer or shipment that is a candidate for storage and/or treatment, the generator provides the following information:

- Container identification number
- Profile number or other approved processes (except for waste transfers of previously accepted waste)
- Waste description
- Generator information (e.g., name, address, point-of-contact, telephone number)
- Container information (e.g., type, size, weight)
- Waste numbers
- Designation as extremely hazardous waste or dangerous waste
- Waste composition
- Packaging materials and quantities.

The pertinent information is entered into a solid waste information tracking system.

Where potential conformance issues exist in the information provided, (e.g., waste characteristics do not match the waste profile information, LLBG waste acceptance criteria, or additional constituents are expected to be present that do not appear on the documentation), the generator is contacted (if available) by the LLBG for resolution. Refer to Section 6.0 for discussion on repeat and review frequency.

For each container, a technical review is performed. WRP waste containers will follow an approved process (Section 2.6.1). Other reviews such as physical screening determination and chemical screening determination are defined in Section 2.2.2 and 2.2.3. Technical review is as follows:

- **Technical review.** The individual container data are compared to the waste profile or other approved process data to ensure the waste to be shipped to the LLBG is as described by the waste profile. Every transfer is reviewed to ensure the waste meets the LLBG waste acceptance criteria.

  Based on waste identification information provided, the waste designation is reviewed to ensure compliance with waste designations per WAC 173-303-070 through -100, as well as evaluating whether the waste meets the LLBG waste acceptance criteria.

  If the transfer or shipment information is found to be acceptable, the LLBG determines if any of the waste containers will be physically or chemically screened. WRP waste will be physically and/or chemically screened as determined by the WRP Program.

2.1.3 Knowledge Requirements

The LLBG ensures that all information used to make waste management decisions will be based on the requirements found in the following sections. Information determined to be 'knowledge' must meet the definition of 'knowledge' provided by WAC 173-303-040.

2.1.3.1 General Knowledge Requirements

Adequate knowledge requires (1) general waste knowledge requirements, (2) LDR waste knowledge requirements, and/or (3) waste knowledge exceptions.

(1) **General Waste Knowledge Requirements for Designation and Waste Management**. At a minimum, the generator supplies enough information for the waste to be treated and/or stored at LLBG. The minimum level of knowledge consists of designation data where the constituents or knowledge of the waste's generating source (in the case of wastes potentially from listed sources) causing a dangerous waste number to be assigned are quantified, and that data addresses any LLBG operational parameters necessary for proper management of the waste.

When process knowledge indicates that constituents, which if present in the waste might cause the waste to be regulated, are input to a process but not expected to be in the waste, sampling and analysis can be performed to ensure the constituents do not appear in the waste above applicable regulatory levels. This requirement can be met through chemical screening. This sampling and analysis is required only for initial characterization of the waste stream.

When the available information does not qualify as knowledge or is not sufficient to characterize a waste for management, the sampling and testing methods outlined in WAC 173-303-110 are used to determine whether a waste designates as ignitable, corrosive, reactive, and/or toxic, and the sampling and testing methods will be used as applicable to determine whether the waste contains free liquids. If the analysis is performed to complete characterization after acceptance of the waste by the LLBG, then this WAP governs the sampling and testing requirements.

(2) **Waste Knowledge Requirements for LDR Compliance.** Waste is stored at the LLBG while awaiting analytical results for LDR requirements. The LLBG portion of the operating record contains all information required to document that the appropriate treatment standards have been met or the treatment required to meet the LDR treatment standards, unless otherwise specified in this section.

For the purposes of this WAP, a representative sample is required to demonstrate compliance with a concentration-based treatment standard (refer to Section 4.0). Corroborative testing for the sample could be accomplished in the following manner.

- Generators could use onsite laboratories or other laboratories to obtain data that could be used as basis to certify that the waste meets concentration-based LDR treatment standards. For waste that must meet method based LDR treatment standards, information must be supplied on the treatment methods necessary to meet LDR requirements and comply with WAC 173-303-380(1)(j),-(k),-(n), and -(o).

- The LLBG uses these analytical data to meet applicable requirements found in WAC 173-303-140(4).

(3) **Waste Knowledge Exceptions**. The LLBG is designed to provide information necessary to further disposition the waste (e.g., repackage, designate, segregate, sample, and analyze). The LLBG shall ensure sufficient information is available (D001, D002, D003, and incompatibility) and operation safeguards are in place to safely process waste. If sufficient information is not available, the waste will enter the discrepant container management process described in Section 2.5 in order to obtain the necessary information.

2.1.3.2 Methodology to Ensure Compliance with Land Disposal Restrictions Requirements for Mixed and Dangerous Waste

All generators of mixed and dangerous waste are subject to LDR requirements and are required to submit all information notifications and certifications described in WAC 173-303-380(1)(j),-(k),-(n), and -(o). Mixed and dangerous waste not meeting the treatment standards, but meeting the LLBG waste acceptance

criteria, can be stored at the LLBG (refer to Section 1.1.1.1). The following are general requirements for offsite notifications or onsite information and supporting documentation.

- The waste is subject to LDR and the generator has treated the waste. The generator supplies the appropriate LDR certification information (WAC 173-303-140).

- The waste is subject to LDR and the generator has determined that the waste meets the LDR for disposal. The generator develops the certification based on process knowledge and/or analytical data and supplies the appropriate LDR certification information necessary to demonstrate compliance with the LDR treatment standards of WAC 173-303-140. State-only LDRs do not require this type of certification.

- The waste is subject to LDR and requires further treatment to meet applicable treatment standard.
  - The generator supplies additional information concerning the waste and details any treatment necessary to meet applicable treatment standards.
  - If waste is treated to meet state-only or federal LDRs at the LLBG, the LLBG prepares information necessary to meet WAC 173-303-380(1)(k) (refer to Section 7.3).

A representative sample of the waste must be submitted for analysis to ensure that concentration-based LDR treatment standards are met. This sample could be taken by the LLBG or the generator, and is required to comply with the treatment standards contained in 40 CFR 268.40 and 268.48 for UHCs.

2.2 Verification

Verification is an assessment performed by the LLBG to substantiate that the waste stream received at the LLBG is the same as represented by the analysis supplied by the generator for the pre-shipment review. Verification is performed on waste received by the LLBG. Verification includes container receipt and inspection. In addition, select containers could be subject to physical screening, and chemical screening. Waste is not accepted by the LLBG for storage and/or treatment until the required elements of verification have been completed, including evaluation of any data obtained from verification activities. Documentation reviewed as part of verification activities could include manifest or onsite shipment document, container inventory documentation, a container listing report, visual verification records, screening analyses, and the waste profile.

All conformance issues identified during the verification process are resolved in accordance with Section 1.1.1.3.3.

Containers previously used to hold non-acute dangerous waste will be evaluated to determine if they are empty by using the following criteria: A container or inner liner is "empty" when all wastes in it have been taken out that can be removed using practices commonly employed to remove materials from that type of container or inner liner (e.g., pouring, pumping, aspirating, etc.) and, no more than one inch of waste remains at the bottom of the container or inner liner, or the volume of waste remaining in the container or inner liner is equal to three percent or less of the container's total capacity, or, if the container's total capacity is greater than one hundred ten gallons, the volume of waste remaining in the container or inner liner is no more than 0.3 percent of the container's total capacity.

The presence of free liquids which readily separate from the solid waste portion of dangerous waste may be determined by either the paint filter test or through NDE results.

2.2.1 Container Receipt Inspection

Container receipt inspection is a mandatory element of the verification process. Therefore, 100 percent of each shipment (including onsite transfers) is inspected at the LLBG for possible damage or leaks, complete labeling, and if present, tamper-resistant seals are intact (Sections 2.2.2 and 2.2.3). This is to ensure that the shipment: (1) is received at the LLBG in good condition, (2) is the waste indicated on the transfer or shipping papers, (3) has not been opened after physical and/or chemical screening was performed, and (4) is complete. When a conformance issue exists, a case-by-case determination is performed and the appropriate action is taken based on the severity of the issue. One of the following actions may be taken as appropriate, in response to a conformance issue:

- Implementation of the contingency plan (DOE/RL-94-02) per the *Building Emergency Plan for Low-Level Burial Grounds* (HNF-IP-0263-LLBG).

- Conformance issues where additional information is needed to safely manage the waste are resolved before verification continues.

- Continuation of verification for waste with conformance issues not meeting the above criteria.

2.2.2 Physical Screening Process

Physical screening is used as a verification element. This section describes the requirement pertaining to methods, frequency, and exceptions concerning the use of physical screening as a verification activity. Physical screening could be performed before the waste is shipped to the LLBG. When physical screening is performed at a location not within the SWOC TSD units, tamper-resistant seals are applied to each container when examined. Upon receipt at the LLBG, tamper-resistant seals are verified as intact to ensure that no changes could have occurred to the waste content. The requirements for adding and/or removing tamper-resistant seals are maintained through an established program. Documentation shall be maintained in the LLBG operating record.

Selection and interpretation of the appropriate physical screening method(s) are conducted by personnel who are trained as required by the *LLBG Dangerous Waste Training Plan* (HNF-1221). Each physical screening method is performed by trained personnel according to *LLBG Dangerous Waste Training Plan* (HNF-1221).

2.2.2.1 Physical and Chemical Screening Determination

Processes must be maintained describing the activities for selecting containers for physical/chemical screening. Authoritative/directive means of selecting containers for physical/chemical screening are used based on the pre-shipment and/or waste stream review process. The selection is based on the contents listed in the associated shipment/waste stream documentation, the variation within and experience with the specific waste type.

Two criteria are used in making the selection. The first criterion is based on whether pre-shipment review activities (document and characterization review) identify areas of potential concern. The second criterion is reviewing the current physical screening percentage (calculated according to Section 2.2.2.3) of containers offered for receipt from said waste stream from said generator that have been offered over the past 12 months or the date of the last physical screening adjustment, whichever occurs last. The rate will be applied as compared to those that have been physically screened. This criterion ensures that the minimum physical screening rates required by this WAP are met.

The number of containers selected for physical screening per waste stream is determined by comparing the calculated percentage rate which is then adjusted according to the PES. This selected group of containers constitutes a sample set.

On determining whether the waste container(s) will be verified, the container(s) is scheduled for shipment.

2.2.2.2 Physical Screening Methods

The following physical screening methods, comply with the requirement to verify a waste.

1. Visual inspection (opening the container)
2. NDE.

Refer to Section 2.2.5 for QC pertaining to physical screening. (Refer to Section 3.1 for the criteria and rationale for choosing a physical screening method.)

Waste packaging that is witnessed by the LLBG or its representative at a non-SWOC location is considered to have met the physical screening requirements denoted in this WAP, provided that the program meets the requirements of WAC 173-303 and the witness is qualified to determine the waste meets acceptance requirements. On closure of the container, tamper-resistant seals must be applied to ensure the integrity of the contents.

2.2.2.3 Physical Screening Frequency

The minimum physical screening frequency is 5 percent for onsite generators, applied per waste stream per generator per year. For offsite generators, the minimum physical screening frequency is 10 percent per waste stream per generator per year. The LLBG adjusts the physical screening frequency for generators based on objective performance criteria (refer to Section 1.1.1.3.1).

If a container fails verification, the waste stream physical screening frequency will be raised to 100 percent with the next containers offered. Subsequent containers offered will be evaluated through the PES for verification rates, as described in Section 1.1.1.3 of this WAP.

2.2.2.4 Physical Screening Exceptions

The following are exceptions to the physical screening process outlined previously.

- Shielded, classified, and remote-handled mixed waste are not required to be physically screened; however, the LLBG performs a more rigorous documentation review and obtains the raw data used to characterize the waste (less than 1 percent of current waste receipts). For classified waste, it is necessary to have an appropriate U.S. Department of Energy security clearance and a need to know the information as defined by the classifying organization or agency.

- Waste that physically cannot be screened at the LLBG or an associated screening facility must be physically screened at the generator location [e.g., large components, containers that can not be opened, for as low as reasonably achievable (ALARA) purposes, or does not fit into a NDE unit]. Physical screening at the generator location consists of observing the packaging of the waste. If no location can be found to perform the physical screening, no screening is required.

- Waste that is packaged by a trained LLBG -delegated representative(s) is considered to have met the physical screening requirements as denoted within this WAP.

- Waste that has been packaged and physically screened at a SWOC TSD unit.

2.2.3 Chemical Screening Process

Chemical screening is used as a verification element. This section describes methods, frequency, and exceptions for chemical screening. Chemical screening could be performed before the waste is shipped to the LLBG. When screening is performed at a location not within the SWOC TSD units, tamper-resistant seals are applied to each container examined and, on receipt at LLBG, verified as acceptable to ensure that no changes could have occurred to the waste content. Processes are maintained by the LLBG detailing the requirements for adding and/or removing tamper-resistant seals. Documentation shall be maintained in the LLBG operating record.

Qualified personnel conduct selection and interpretation of chemical screening methods. Unless otherwise noted, tests are qualitative, not quantitative. The objective of screening is to obtain reasonable assurance that the waste generally consistent with the description on the shipping documentation. The following tests are selected depending on the waste matrix and the applicability of the method.

- pH
- Peroxide
- Oxidizer
- Water reactivity
- HOC (chlor-n-oil/water/soil)
- Headspace
- Sulfide
- Cyanide
- Paint filter.

Refer to Section 2.2.5 for QC information for chemical screening. Processes are maintained by the LLBG that define the basis for selecting screening tests.

2.2.3.1 Chemical Screening Frequency

At a minimum, 10 percent of the mixed or dangerous waste containers verified by physical screening (Section 2.2.2) must be screened chemically. LLBG obtains a representative sample, which could be a grab sample.

Small containers of waste (labpacks), not otherwise identified in the exceptions and packaged in accordance with 40 CFR 264.316, 40 CFR 265.316, and WAC 173-303-161 are screened chemically in accordance with the chemical screening frequency of the waste stream as determined by the PES team (Section 1.1.1.3). Inner containers are segregated by physical appearance. At least one container from each group (or three containers if all are similar) are screened chemically.

2.2.3.2 Chemical Screening Exceptions

The following are cases in which chemical screening is not required.

- Small containers of waste in overpacked containers (labpacks) packaged in accordance with WAC 173 303-161 and not prohibited under LDR specified in WAC 173-303-140

- Waste exempted from the physical screening requirements (Section 2.2.2.4)

- Commercial chemical products in the original product container(s) (e.g., off-specification, outdated, or unused products)

- Chemical containing equipment removed from service, (e.g., ballasts, batteries)

- Waste containing asbestos

- Waste, environmental media, and/or debris from the cleanup of spills or release of single substance or commercial product or otherwise known material (e.g., material for which an MSDS can be provided)

- Confirmed noninfectious waste (e.g., xylene, acetone, ethyl alcohol, isopropyl alcohol) generated from laboratory tissue preparation, slide staining, or fixing processes

- Hazardous debris as defined in WAC 173-303-040

- Other special cases could be exempted on a case-by-case basis.

2.2.4 Sampling for Confirmation Screening

Sampling is performed in accordance with WAC 173-303-110(2). A representative sample is obtained for chemical screening. The chemical screening methods described in Section3.0 do not require any sample preservation methods because the screening tests are performed at the time and location of sampling, or as soon as possible thereafter. During the interim period, the samples are stored in a manner that maintains chain of custody and protects the sample composition.

2.2.5 Quality Assurance and Quality Control for Confirmation Process

The following QA and QC elements are used by the LLBG to ensure confirmation activities provide sufficient data to provide an indication that waste received is as described in the shipping documentation. Physical/chemical screening methods shall have sufficient performance levels to yield valid decisions when considering method variability (precision and accuracy). Data quality objectives have been established with Ecology in accordance with TPA Action Plan Section 6.5 (Ecology et al. 2003) and have been documented and reflected in this WAP. In addition, all screening equipment requiring calibrations shall be checked before use to ensure calibration dates are current and equipment is functioning properly. This check will be documented in equipment log books. Personnel performing screening activities are properly trained and current certifications are on record. During screening activities strict compliance with applicable industrial hygiene and safety standards is mandatory.

2.2.5.1 Physical Screening Quality Control

This section describes the QC used by LLBG to ensure that quality data are obtained when performing physical screening methods identified in Section 2.2.2, except visual inspection. Physical screening QC is used only to ensure that quality data are obtained when performing NDE. Visual inspection does not consist of the use of instrumentation or chemical tests. QC objectives for visual inspection are obtained through the appropriate training.

The following QC elements apply to NDE used for physical screening:

- A penetration test is performed when image data generating components are changed to document system capability has not changed.

- A resolution test is performed at the beginning of a shift. A shift ends when shutdown activities are performed. A shift can be up to 24-hours.

- A radiographer is qualified per SNT-TC-IA, Level II certification of American Society of Nondestructive Testing training.

- Examination must cover 100 percent of the waste in the container.

- At minimum annually, a capability demonstration is performed on a training drum.

2.2.5.2 Chemical Screening Quality Control

The following QC elements are used when performing chemical screening.

- Appropriate sample containers and equipment are used.
  - Containers and equipment of the appropriate size that are chemically compatible with the waste and testing reagents shall be used.

- Reagent checks
  - Water that is reagent grade and from a documented source shall be used.
  - Chemicals and test kits must be labeled so that these are traceable and documented in the LLBG operating record.
  - QC checks shall be performed on each lot of test kit and associated reagents and documented in the LLBG operating record, unless a more frequent period is specified in the test kit instructions.
  - Personnel performing chemical screening are adequately trained and current qualifications/certifications are on record.

2.3 Waste Transfers Between Solid Waste Operations Complex TSD Units

Transfers from the SWOC TSD units to the LLBG may be necessary to perform verification, obtain additional knowledge to support treatment/disposal, to make the waste amenable for long-term storage, or to perform treatment. A technical review is required to ensure compliance with the LLBG waste acceptance criteria. For waste that is being transferred from the SWOC TSD units TSD units to the LLBG, the following requirements apply.

2.3.1 Waste Stream Approval Process

The waste stream must already have been approved using the process described in Section 2.1.1. Waste knowledge exceptions apply as described in Section 2.1.3.1.

For retrieval of suspect-mixed waste streams from the LLBG, sufficient information must be available to further disposition the waste. Mixed waste containers are transferred out of the LLBG to another TSD unit and ultimately received at WRAP or another approved TSD unit for packaging and/or treatment. The amount and type of data that exists for a given waste package vary widely and depend on the documentation requirements in effect when the waste was generated. The SWOC TSD unit is required to supply specific information about the waste package contents. A technical review of the records is performed as described in Section 2.3.2 and suspect dangerous waste items are identified. Suspect mixed

or dangerous waste will be evaluated and managed for safe storage until a waste designation can be completed. Additionally, a visual inspection is performed on the containers before transfer.

2.3.2 Waste Transfer Approval Process

A technical review of documentation associated with each waste container in the shipment is performed to ensure the waste meets the LLBG waste acceptance criteria. The individual container data, inclusive of all knowledge obtained on the container is compared to the LLBG's waste acceptance requirements. If necessary, the waste management path (waste specification record) previously assigned to the waste stream is updated and re-labeling/remarking is completed before the transfer. Waste is tracked through processing at the LLBG in accordance with Section 1.1.1. When characteristics of the waste change as a result of treatment or other processing, documentation will be entered into the unit-specific operating record. As new information is obtained on the waste, the container is managed to any new requirements. Updates to container data during transfer and subsequent processing activities are reflected in solid waste information tracking system, documented, and maintained in accordance with Section 8.0.

2.3.3 Verification

For container receipt inspection, 100 percent of each transfer is inspected for damage and to ensure the waste containers are those indicated on the documentation. This activity is a mechanism for identifying any document conformance issues or damaged containers before receipt/acceptance. Conformance issues identified during receipt are managed as described in Section 2.2.1.

For physical/chemical screening, once waste has been verified, additional physical/chemical screening is not required.

2.3.4 Performance Evaluation System

The performance of the generator is evaluated and documented in accordance with the PES as described in Section 1.1.1.3. The PES is used to determine physical screening frequency and determine corrective actions for conformance issues. The performance evaluation considers all newly-generated waste accepted at SWOC TSD units.

2.4 Waste Acceptance

Initial acceptance of waste occurs only after the confirmation process described in Section 3.2.0 is complete. Conformance issues identified during the confirmation process are documented and managed in accordance with Section 1.1.1.3.3. Conformance issues that must be corrected before waste acceptance include:

- Waste does not match approved profile documentation,
- Designation, physical, and/or chemical characterization discrepancy,
- Incorrect LDR paperwork,
- Packaging discrepancy,
- Manifest discrepancies as described in WAC 173-303-370(4)(a) [for offsite shipments unless Permit Conditions II.P.2 can be utilized (Ecology 2004)].

Waste that does not meet the LLBG waste acceptance criteria can be accepted when that waste is scheduled for discrepancy resolution. The discrepancy resolution activities will be tracked to completion (refer to Section 2.5).

2.5 Discrepant Container Management

During the waste acceptance process at the LLBG or another SWOC TSD unit (e.g., T Plant, WRAP, or CWC), an issue can arise where a container will be identified with a discrepant item(s) and will be called a 'discrepant container.' When a discrepant container is identified that would affect the management of the container, the following processes will be initiated:

- Liquids discovered in nonempty containers will be placed in secondary containment that meets the requirements of WAC 173-303-630(7)(a). For combination packages[1], if the liquids are only present within inner containers and no free liquids are present in the outer container, the external container will serve as secondary containment, provided that the combination package can be managed in a manner that meets the requirements of WAC 173-303-630(7)(a) and the compatibility requirements in WAC 173-303-395(1).
- An evaluation will be performed to ensure the compatibility with the other materials in the container and with the outer container in accordance with WAC 173-303-395(1)(b) and will be documented in accordance with WAC 173-303-395(1)(c). Liquids not determined to be compatible with the waste contents or the container will be segregated and placed on separate spill containment.
- If adequate information is unavailable to determine the liquids constitute an imminent hazard, the container will be segregated and placed on separate spill containment and placed as a priority for discrepancy resolution.
- For waste where the generator can be contacted, the generator will be requested to provide additional information. The container will be dispositioned by either returning it to the generator (provided it can be transported safely and compliantly) or by resolving the discrepancy on the container at a SWOC TSD unit.
- For project waste an evaluation will be performed on available historical data. In addition, interviews could be performed with project points-of-contact, NDE personnel, etc.
- Based upon the evaluation of information (hazards identified) the container will be managed in a safe configuration.
- The container will be scheduled for discrepancy resolution.

2.6 Sampling and Analysis Plans

A sampling and analysis plan (SAP) can be developed outside the WAP to support characterization of waste for various projects. A SAP will provide sufficient detail to ensure that sampling personnel and the analytical laboratory correctly implement the data quality objectives (DQOs) and quality assurance project plan requirements pursuant to TPA Action Plan Section 6.5 (Ecology et al. 2003). Sampling and analysis plans can utilize existing process knowledge and/or analytical data in combination with sampling requirements as identified in the SAP to sufficiently characterize a waste stream for acceptance into a SWOC unit.

[1] A combination package is any configuration where dangerous and/or mixed wastes are confined within (inner) containers, which are in turn stored within secondary, external (outer) containers. Examples include labpacks, certain overpacks, portable spill pallets, or any container configuration that has an outer container with one or more inner containers.

2.7 Waste Stream Approval Process for WRP Waste

The waste stream approval process consists of reviewing stream information supplied on a knowledge document and attached analysis (if available). At a minimum, the knowledge documentation or other approved processes requests the following information:

- Generator information (e.g., name, address, point-of-contact, telephone number)
- Waste stream name
- Waste generating process description
- Chemical characterization information (e.g., characterization method(s), chemicals present, concentration ranges)
- Designation information
- Waste type information (e.g., physical state, absorbents used, inert materials, stabilizing agents used)
- Packaging information (e.g., container type, maximum weight, size)
- Attachments could consist of container drawings, process flow information, analytical data, etc.

This information is developed on a waste stream basis and applied to individual containers prior to transfer. If conformance issues are found during this review, additional information is requested that could include analytical data or a sample to be analyzed.

2.8 Generated Waste

Waste generated by LLBG is considered accepted at LLBG when the waste is generated. Knowledge concerning the generated waste will be entered into the LLBG operating record.

3.0 SELECTING WASTE ANALYSIS PARAMETERS

Physical/chemical screening parameters for verification must be chosen from those in Sections 3.1 and 3.2. Parameters for waste designation and to meet LDR requirements are addressed in Section 3.3. Each physical/chemical screening result must be in agreement with the shipping documentation to determine the acceptability of the result. Conformance issues identified during the confirmation process are documented and managed in accordance with Section 1.1.1.3. Parameters, methods, and rationale for physical/chemical screening parameters are provided in Table 3-1.

Table 3-1. Parameters and Rationale for Physical and Chemical Screening.

Parameter	Method[a]	Rationale for Selection
Physical Screening		
Visual inspection	Field method – observe phases, presence of solids in waste	Confirm consistency between waste and shipping documentation.
Nondestructive evaluation	Field method	Confirm consistency between waste and shipping documentation.
Chemical Screening		
Ignitability and/or headspace volatile organic compound screening	Organic vapor monitor, colorimetric gas sampling tubes, or a lower explosive level meter	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Peroxide	Field peroxide test paper	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Liquids	SW-846, Method 9095, Paint Filter Liquids Test	Confirm consistency between waste and shipping documentation.
pH	Field pH screen (pH paper method)	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Oxidizer	Field potassium iodide test paper	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Water reactivity	Field water mix screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Cyanides	Field cyanide screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Sulfides	Field sulfide screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Halogenated Organic Carbons	Screening test method for PCBs in transformer oil (SW-846, Method 9079)	Confirm consistency between waste and shipping documentation.

[a] Processes based on manufacturer's recommended methodology for test kit or testing equipment, unless otherwise noted. When regulations require a specific method, the method shall be followed.

3.1 Physical Screening Parameters

The following methods are approved for use in performing physical screening.

(1) Visual inspection (preferred method for physical screening):

Rationale. This method meets the requirement to ensure consistency between waste containers and the accompanying waste stream documentation.

Method: The container is opened and the contents are removed as needed for visual examination. Homogenous loose solids are probed to determine the presence of material not documented on the waste stream documentation, or for improperly absorbed liquids. Visual observations are compared with the applicable profile information and the container specific information in the waste stream documentation.

Failure criteria: A container fails inspection for any of the following reasons; (a) undocumented, improperly packaged, or inadequately absorbed liquids; (b) discovery of prohibited articles or materials listed in Section 1.2; (c) discovery of material not consistent with the applicable waste stream documentation ; and (d) variability greater than 25 percent by volume in listed constituents (e.g., paper, plastic, cloth, metal).

(2) NDE:

Rationale. This method meets the requirement to ensure consistency between waste containers and the accompanying waste stream documentation. This method also is subject to the QA requirements listed in Section 2.2.5. Containers that are not easily amenable to visual inspection because of physical or radiological content, or facility availability can be examined safely and economically.

Method: The container is scanned with a NDE system. Data are observed on a video monitor and captured and recorded. Personnel experienced with the interpretation of NDE imagery record their observations. These observations are compared to the contents listed on the waste stream documentation.

Failure criteria: A container fails the inspection for any of the following reasons; (a) undocumented, improperly packaged, or inadequately absorbed liquids; (b) discovery of prohibited articles listed in Section 1.2; (c) image data not consistent with the applicable waste stream documentation; and (d) variability greater than 25 percent by volume in listed constituents (e.g., paper, plastic, cloth, metal).

3.2 Chemical Screening Parameters

The following methods are approved for use in performing chemical screening tests. Chemical screening is used to verify that incoming waste is consistent with waste stream documentation. Failure of a chemical screening test is defined as a chemical screening result that is inconsistent with the associated waste stream documentation.

(1) Ignitability and/or headspace volatile organic compound screening:

Rationale: To determine the potential ignitability and the presence or absence of volatile organic compounds in waste, and to ensure that personnel are adequately protected. This method is used when containers are opened for inspection. This method can be applied to any matrix.

Method: A sample of the headspace gases in a container is analyzed by one or more of the following types of portable instrumentation: organic vapor monitor, colorimetric gas sampling tubes, or a lower explosive level meter.

Failure criteria: High organic vapor readings in matrices not documented as having volatile organic content constitutes failure.

(2) Peroxide screening:

Rationale: To determine the presence of organic peroxides in solvent wastes, to alert personnel to potential hazards, to ensure safe segregation and storage of incompatible wastes, and to confirm consistency with the waste stream documentation. The test is sensitive to low parts per million ranges.

Method: A peroxide test strip is dampened with a pipet sample of liquid waste. Solids are tested by first wetting the test strip with water and contacting a small sample of the waste. A blue color change indicates a positive reaction. The color change can be compared with a chart on the packaging to determine an approximate organic peroxide concentration.

Failure criteria: Peroxide concentrations greater than 20 parts per million in liquid waste constituents that are known organic peroxide formers not documented as having been stabilized constitutes failure. Results that are not consistent with documented constituents fails verification.

(3) Paint filter liquids test:

Rationale: To verify the presence or absence of free liquid in solid or semisolid material.

Method: To a standard paint filter, 100 cubic centimeters or 100 grams of waste are added and allowed to settle for 5 minutes. Any liquid passing through the filter signifies failure of the test. The required method for the paint filter liquids test is method 9095 in the U.S. Environmental Protection Agency (EPA), SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (the most recently promulgated version) (EPA 1986).

Failure criteria: Failure of the test in waste matrices not documented as having free liquids constitutes failure of the container. Small quantities of condensate trapped in inner plastic liner folds are acceptable.

(4) pH screen:

Rationale: To identify the pH and corrosive nature of an aqueous or solid waste, to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation.

Method: pH measurement is performed in accordance with SW-846. Processes are maintained by the LLBG and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: If the pH of a matrix exceeds regulatory limits (less than or equal to 2.0 or greater than or equal to 12.5) in waste not documented as being regulated for this property, the container fails verification.

(5) Oxidizer screen:

Rationale: To determine if a waste exhibits oxidizing properties, to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation. This test can be applied to waste liquids, solids, and semisolids.

Method: 1 or 2 drops of 3N HCl acid is added to the Oxidizer test paper (potassium iodide, starch). The test paper is touched to a pea size sample of the waste to be tested. A black, blue/black, or purple color change determines a positive oxidizer test. Processes are maintained by the LLBG and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(6) Water reactivity screen:

Rationale: To determine if the waste has the potential to vigorously react with water to form gases or other reaction products. This information is used to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation.

Method: 2 or 3 drops of distilled water is added to an oxidizer test paper strip. The test paper is touched to a pea size sample of the waste to be tested. The observance of effervescence, a violent reaction, flaming or boiling indicates a positive test. Processes are maintained by the LLBG and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(7) Cyanide screen:

Rationale: To indicate if waste could release hydrogen cyanide on acidification near pH 2. This information is used to ensure safe segregation and storage of incompatible waste and to confirm consistency with the waste stream documentation.

Method: A pea size sample of the waste to be tested is dissolved in a small quantity of water. A mixture of ferrous ammonium sulfate and ferrous ammonium citrate is added to the stoppered test tube. The sample is then shaken and 3N HCl is added to the solution. A dark Prussian blue color change indicates the presence of the acid. Processes are maintained by the LLBG and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(8) Sulfide screen:

Rationale: To indicate if the waste could release hydrogen sulfide on acidification near pH 2. This information is used to ensure safe segregation and storage of incompatible wastes and to confirm consistency with the waste stream documentation.

Method: 5 drops of 3N HCl acid is added to a pea size sample of the waste to be tested. Lead acetate test paper is touched to the sample. A brown or black color change of paper indicates a positive test. Processes are maintained by the LLBG and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(9) Halogenated Organic Carbons screen:

Rationale: To indicate whether PCBs or other chlorinated solvents are present in the waste. This information is used to confirm consistency with the waste stream documentation and to determine if additional information/data are needed to properly store and treat the waste.

Methods: Field organic chlorine tests appropriate to the matrix, such as those offered by the Dexsil Corporation (e.g., Chlor-N-Oil, Chlor-N-Soil), are used. These screening tests are available with several detection limits that enable the verification to be performed in the concentration range applicable to the proposed management path of the waste.

Failure criteria: A positive indication of chlorinated organics in a waste that is not documented as having chlorinated organic content constitutes failure.

3.3 Other Analysis Parameters

Parameters needed to meet designation, characterization, and LDR requirements for mixed and dangerous waste stored and/or treated at the LLBG are identified in Table 3-2. The most recent promulgated method for SW-846 shall be used.

In determining the characteristic of ignitability, either the Pensky-Martens (method 1010) or the Setaflash (method 1020), must be employed when testing. The characteristic of corrosivity also requires a specific test method. When testing the pH of a given waste stream, method 9040 or method 9045 must be used in accordance with WAC 173-303-090(6).

Compliance with LDR for mixed and dangerous waste that have a treatment standard expressed as constituent concentrations in wastes (CCW) (40 CFR 268.40, incorporated by reference by WAC 173-303-140) can be shown using any appropriate method. If the waste treatment standard is expressed as constituent concentrations in waste extracts (CCWE) (40 CFR 268.40, incorporated by reference by WAC 173-303-140), then the Toxicity Characteristic Leaching Procedure (TCLP) EPA SW-846 Method 1311, which is specifically referenced in 40 CFR 268.41(a), must be performed. Following that, however, any appropriate method may be used to determine concentrations of hazardous constituents in the extract and to show compliance with LDR. Both Cyanides (Total) and Cyanides (Amenable) for nonwastewaters are to be analyzed using Method 9010 or 9012, as incorporated by reference in 40 CFR 260.11. UHCs will be evaluated as required by 40 CFR 268.48.

For other parameters or methods not otherwise specified, the following are acceptable sources of testing methods (standard methods):

- Analytical methods cited in WAC 173-303.

- The most recently promulgated version of *Test Method for Evaluating Solid Waste: Physical/ Chemical Methods*, SW-846, U.S. Environmental Protection Agency, EPA, Office of Solid Waste.

- Other current U.S. EPA methods, as applicable to the matrix under evaluation.

- *Standard Methods for the Examination of Water and Wastewater, American Public Health Association* (APHA), American Water Works Association, Water Environment Federation.

- *Annual Book of ASTM Standards, American Society for Testing and Materials.*

- *AOAC Official Methods of Analysis*, AOAC (Association of Official Analytical Chemists), International.

Appropriate QA/QC documentation is required to be maintained per Section 5.0, regardless of the method used.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Low-Level Burial Grounds.

Parameter		Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
General chemistry					
Flashpoint		1010/1020	Liquid	To provide documentation for safe storage conditions	To determine regulatory status as D001 waste, to provide proper waste designation and applicability of LDR requirements
pH	Liquid	9040	Liquid, sludge	To indicate the degree of corrosivity for safe handling; to provide for proper waste designation; and to identify waste that might compromise container integrity	To determine regulatory status as D002 waste, to provide proper waste designation, applicability of LDR requirements and state-only requirements.
	Solid	9045	Solid		
Hydroxide		9040	Liquid	To provide documentation for safe treatment and storage conditions; and to comply with the LLBG waste acceptance criteria.	To provide proper waste designation and applicability of LDR requirements.
Water reactivity		Field method	Liquid, sludge	To determine whether the waste has a potential to violently react with water to form gases or generate heat; to provide documentation for safe treatment and/or storage conditions for waste designation; and to comply with the LLBG is waste acceptance criteria.	To provide proper waste designation; safe storage and management.
Free liquids		9095	Liquid, sludge, solid	To determine applicability of LDRs and for characterization of appropriate treatment	To determine appropriate state-only LDR status of the waste.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Low-Level Burial Grounds.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Cyanide	9010/9012	Liquid, sludge, solid	For safe storage; for proper waste designation; applicability of LDR; and characterization of appropriate treatment	To provide proper waste designation and applicability of LDR requirements.
Sulfide	9030	Liquid, sludge, solid	For safe storage; for proper waste designation; applicability of LDR; and characterization of appropriate treatment	To provide proper waste designation and applicability of LDR requirements.
Organic analyses				
PCBs	8082	Liquid, sludge, solid	To determine proper waste designation for management of waste in accordance with the *Toxic Substance Control Act (TSCA) of 1976* and WAC 173-303.	To provide proper waste designation and to meet TSCA and LDR requirements.
Total organic carbon	9060	Liquid, sludge, solid	To determine applicability of LDR and applicability to state-only requirements.	To provide proper waste designation and applicability to state-only requirements, to meet LDR requirements, and comply with the LLBG waste acceptance criteria.
Total organic halides	9020/9021/9022	Liquid, sludge	To determine proper waste designation and applicability to state-only requirements.	To provide proper waste designation and applicability to state-only requirements.
Persistent constituents	9075/9076/9077/ 9211/9212/9214/ 9250/9251/9253			
Total suspended solids	160.2[b]	Liquid, sludge	To determine applicability of LDR and status as a wastewater	To provide applicability of LDR and status as a wastewater.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Low-Level Burial Grounds.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Volatile organic compounds	1311/8260	Liquid, sludge, solid	To determine proper waste designation, applicability of LDRs, and characterization of appropriate treatment.	To provide proper waste designation, regulatory status, and applicability of LDR requirements.
Semi volatile organic compounds	1311/8270	Liquid, sludge, solid	To determine proper waste designation, applicability of LDRs, and characterization of appropriate treatment.	To provide proper waste designation, regulatory status, and applicability of LDR requirements.
Chlorinated herbicides	8151	Liquid	Not applicable	To provide proper waste designation and applicability to state-only requirements.
Inorganic analyses				
Arsenic	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Barium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Cadmium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Chromium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Low-Level Burial Grounds.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Lead	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Mercury	1311/7470/6020	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Silver	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Selenium	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Antimony	6010	Liquid sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Beryllium	6010	Liquid sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Nickel	6010	Liquid, sludge, solid	To determine applicability of LDRs, and for characterization of appropriate treatment.	To meet LDR requirements.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at Low-Level Burial Grounds.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Thallium	6010	Liquid sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.

[a] Procedures based on EPA SW-846, unless otherwise noted. When regulations require a specific method, the method shall be followed.
[b] EPA-600/4-79/020 (EPA 1983), unless otherwise noted.
LDR = land disposal restriction.
PCB = polychlorinated biphenyls.

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4.0 SELECTING SAMPLING PROCESSES

Specific sampling processes and techniques depend on both the nature of the material and the type of packaging. Waste samples are handled and preserved as necessary to protect the sample. For treatment, preservation techniques, and holding times the LLBG shall utilize the processes and techniques recommended in SW-846. This section describes the sampling methodology used to obtain representative samples. DQOs have been established with Ecology in accordance with TPA Action Plan Section 6.5 (Ecology et al. 2003) and have been documented and reflected in this WAP.

4.1 Sampling Strategies

Table 4-1 contains waste forms and sample equipment used to sample referenced waste. Sampling of these waste forms is performed in accordance with Table 4-1.

4.2 Sampling Methods

Samples are processed at one of several laboratories qualified to perform analysis of waste samples (refer to Section 5.0). Sampling methods are those described in WAC 173-303 110(2) and incorporated by reference into this plan.

The basic sampling sequence includes the following:

- Obtain a unique sample number and complete the sample tag before sampling
- Obtain a precleaned sampler and sample bottles
- Attach sample label to sample bottles
- For sampling liquid waste, use a sampler or pipet to sample for two phase liquids. Homogeneous liquids in small containers will be poured into a sample bottle
- For sampling solid waste, use a scoop, trier, or hand auger to obtain a sample of the waste. For large containers of waste, composite several augers or scoops to ensure samples are representative
- Fill sample containers in the following sequence: volatile organics, semivolatile organics, metals, ignitability, pH (corrosivity)
- For solid waste, wipe the exterior surfaces of the sample bottles with a dry rag
- Attach sample labels to outer plastic bags
- Place samples in an appropriate receptacle for transfer to the laboratory
- Complete the chain-of-custody forms
- Seal and mark the receptacle in accordance with WAC 173-303-071(3)(1)
- Transfer receptacle to the analytical laboratory, as appropriate to meet sample holding times

- Properly clean and decontaminate nondisposable sampling equipment or package for return to central sampling equipment decontamination area according to onsite requirements.

4.3 Selecting Sampling Equipment

Sampling equipment selection is detailed in Table 4-1. Sampling equipment needed to sample waste is maintained and decontaminated as necessary by the LLBG to ensure representative samples according to SW-846.

4.4 Sample Preservation

Sample preservation follows SW-846 protocol; however, other approved preservation methods can be used.

4.5 Establishing Quality Assurance and Quality Control For Sampling

This WAP incorporates the requirements of Permit Condition II.E, for QA/QC. Sample collectors prepare a permanent log of sampling activities in accordance with SW-846, Chapter 9.0. Records are maintained in accordance with Section 8.0 of this WAP. Log entries include as appropriate: date of collection, time of collection, location, batch number, sample number, tank number, copy of the chain-of-custody form, sampling methodology, container description, waste matrix (liquid), description of generating process (e.g., decontamination activities), number and volume of samples, field observations, field measurements (e.g., pH, percent lower explosive limit), laboratory destination and laboratory number, and signature. These log entries are made by the appropriate personnel while the sampling is performed. The logs or copies of logs are maintained in the LLBG operating record after completion of sampling activities.

A chain-of-custody record accompanies samples at all times. The LLBG shall maintain written chain-of-custody processes to ensure accountability of waste sample handling and to ensure sample integrity. All samples are labeled with a unique identifier.

During all sampling activities, strict compliance with applicable industrial hygiene and safety standards is mandatory. Appropriate sampling and decontamination processes are used.

The following QA/QC elements are used by the LLBG to ensure sampling activities for designation purposes result in acceptable laboratory data:

- Representative sampling methods as defined by WAC 173-303-110(2); 40 CFR 261 Appendix I; and/or SW-846 Chapter 9.0
- Appropriate sample containers and equipment
- Samples numbered
- Traceable labeling system
- Field QA/QC samples (applicable SAP)
- Equipment calibration (current as appropriate)
- Chain-of-custody.

Table 4-1. LLBG Chemical Screening Sampling Equipment.

Waste form	Reference in SW-846, Chapter 9.0	
	Waste type	Equipment*
Liquids	Free-flowing liquids and slurries	COLIWASA, glass thief or pipet
Solidified liquids	Sludges	Trier, scoops and shovels
Sludges	Sludges	Trier, scoops and shovels
Soils	Sand or packed powders and granules	Auger, scoops and shovels
Absorbents	Large-grained solids	Large trier, scoops and shovels
Wet absorbents	Moist powders or granules	Trier, scoops and shovels
Process solids and salts	Moist powders or granules	Trier, scoops and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, scoops and shovels
	Large-grained solids	Large trier, scoops and shovels
Ion exchange resins	Moist powders or granules	Trier, scoops and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, scoops and shovels

COLIWASA = composite liquid waste sampler.
* other ASTM-approved equipment could be used to collect samples.

The equipment requirements of Table 4-1, as amended by any Permit conditions, apply to sampling for chemical screening. In addition, the following sampling equipment may be used in sampling for chemical screening: (1) For liquids and slurries – dip, tank, bomb, and bailer samplers, as well as tube-type samplers (e.g., thin-walled Shelby tubes, split spoons, probes); and (2) For sludges and solids – tube-type samplers and augers; for small containers, a spoon may be used in place of a scoop.

5.0 LABORATORY SELECTION AND QUALITY ASSURANCE/QUALITY CONTROL

The selection of any laboratory shall be based on the ability of the laboratory to demonstrate compliance to this section with experience and capability in the following major categories:

- Comprehensive written QA/QC program
- Technical analytical expertise
- Effective information management systems.

The QA and QC requirements outlined in this section are applicable to laboratory activities governed by this WAP.

5.1 Evaluation of Laboratories

All laboratories providing analytical support to the LLBG are required to have a current, laboratory approved QA plan. The laboratory QA plan shall be submitted to the LLBG, and if necessary to Ecology in accordance with TPA Action Plan Section 6.5 (Ecology et al. 2003), for review and acceptance before commencement of analytical work. The QA plan shall, at a minimum, address the following elements:

- Sample custody and management practices (also refer to Section 4.0)
- Sample preservation protocols
- Sample preparation and analytical process requirements
- Instrument maintenance and calibration requirements
- Internal QC measures, e.g., method blanks, spikes
- Corrective action process.

Each laboratory shall be audited periodically by an independent organization to evaluate the effective implementation of the laboratory's QA/QC program. QA personnel and a technical expert shall evaluate the laboratory through onsite observations and/or reviews of the following documentation: copies of the QA/QC documents; records of surveillances/inspections; audits; non-conformances, and corrective actions. The LLBG shall ensure independent organizations; QA personnel and technical experts are qualified to perform these evaluations.

5.2 Quality Assurance/Quality Control Objectives

The overriding goal of the analytical program is to support the accurate designation of waste and/or demonstrate compliance to LDR standards. Laboratory QA/QC programs shall be designed to meet the following objectives.

- Minimize errors. Errors could be introduced during preparative, analytical, and/or reporting phases of work. QC program elements include analysis of samples to written and approved processes and certification of the laboratory.

- Provide information. The designation of waste relies on a combination of knowledge and data. QA/QC programs that ensures accurate, precise, reliable, and reproducible data.

Key QA program elements are designed to provide objective evidence that waste analysis methods meet the performance specifications of the LLBG. QA activities and implementation responsibilities are as follows:

- Activity based laboratory inspections. Inspections are performed by the LLBG. Inspections verify that specific guidelines, specifications, or processes for the activities are completed successfully.

- Laboratory analyses. Analyses are performed by onsite or offsite laboratories on samples of waste using written and approved processes.

- Development of inspection checklists. Checklists are required for laboratory inspections and are designed to ensure that the inspected activity is consistently addressed. Checklists are completed during the inspection to document results.

- Instrument calibration and calibration verification. These activities are performed by the laboratory and are required for ensuring data of known accuracy and precision. Calibration data are maintained and stored to ensure traceability to reported results.

5.3 Laboratory Quality Assurance/Quality Control

All analytical work shall be defined and controlled by a statement of work, work order, or other work authorizing documentation. These authorizations documents shall include QA performance requirements. Samples will be handled according to approved, written and controlled laboratory processes. The accuracy, precision, and limitations of analytical data are evaluated through QC performance.

As needed, the LLBG will conducts analyses to determine completeness of information and whether waste meets the acceptance criteria for treatment, storage, or disposal at one of the Hanford Facility TSD units or those of a chosen offsite TSD facility. Testing and analytical methods will depend on the type of analysis sought and the reason for needing the information. For parameters or methods not otherwise specified in Section 3.0, the following are acceptable sources of testing methods (standard methods).

- Analytical methods cited in WAC 173-303;

- The most recently promulgated version of *Test Method for Evaluating Solid Waste: Physical/ Chemical Methods*, SW-846, U.S. Environmental Protection Agency, EPA, Office of Solid Waste;

- Other current U.S. EPA methods, as applicable to the matrix under evaluation;

- *Standard Methods for the Examination of Water and Wastewater, American Public Health Association* (APHA), American Water Works Association, Water Environment Federation;

- *Annual Book of ASTM Standards, American Society for Testing and Materials*;

- *AOAC Official Methods of Analysis*, AOAC (Association of Official Analytical Chemists), International.

Other laboratory approved, written and controlled analytical methods, proprietary methods, and non-standard methods may be needed to develop operational and safety related information.

5.4 Data Assessment

Data used for decision making need to be scientifically sound, of known quality, and thoroughly documented. Data validation is not required; however, the LLBG is responsible to ensure that data assessment or evaluation is completed. Data are assessed to determine compliance with quality standards approved by Ecology and established by this Permit in Section 5.3 are as follows.

Precision – The overall precision shall be the agreement among the collected samples (duplicates) for the same parameters, at the same location, subjected to the same preparative and analytical techniques. Analytical precision shall be the agreement among individual test portions taken from the same sample, for the same parameters, subjected to the same preparative and analytical techniques.

Accuracy – Accuracy of the measurement system shall be evaluated by use of various kinds of QA samples, including, but not limited to, certified standards, in-house standards, and performance evaluation samples.

Representativeness – Representativeness addresses the degree to which the data accurately and precisely represent a real characterization of the waste stream, parameter variation at a sampling point, sampling conditions, and the environmental condition at the time of sampling. The issue of representativeness is addressed for the following points:

- Based on the generating process, the waste stream, and its volume, an adequate number of sampling locations are selected;
- The representativeness of selected media has been defined accurately;
- The sampling and analytical methodologies are appropriate;
- The environmental conditions at the time of sampling are documented.

Completeness – Completeness is the amount of usable data obtained from a measurement system compared to the total amount of data requested.

Comparability – Comparability is the confidence with which one data set can be compared to another. This usually is accomplished by application of statistical methods.

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6.0 SELECTING WASTE RE-EVALUATION FREQUENCIES

The waste profile and supporting data and documentation shall be re-evaluated at least annually, or more often, if the generator has informed the LLBG of a change in the waste generation process, or if waste received at the LLBG C or the description on the shipping documentation does not match the waste profile. If the generator has informed the LLBG of a change in the waste generation process, the waste re-enters the waste stream approval process described in Section 2.1.1. The LLBG will evaluate verification data against the waste profile to identify any waste streams for which a change in waste generation process is suspect. If a waste stream is suspect, that waste stream will re-enter the approval process described in Section 2.1.1.

When a waste profile is re-evaluated, the LLBG could request the generator to do one or more of the following:

- Verify accuracy of current waste profile;
- Supply a new waste profile;
- Submit a sample to confirm the waste is still within the profile parameters.

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7.0 SPECIAL WASTE ANALYSIS PROCEDURAL REQUIREMENTS

This section discusses any special process requirements for receiving mixed waste at the LLBG.

7.1 Processes for Receiving Onsite and Offsite Waste

The processes for receiving waste are described in Section 2.0. In general, mixed waste received from onsite generators is managed the same as waste received from offsite generators. Differences include, but are not limited to the following: (1) physical/chemical screening frequencies for verification [minimum percentages of 5 percent for waste from onsite generators and 10 percent for waste from offsite generators (note that chemical screening frequency depends on the physical screening frequency)], (2) shipping documentation (Uniform Hazardous Waste Manifests are used for waste from offsite generators and shipping documents are used for waste from onsite generators), and (3) LDR documentation requirements for mixed or dangerous waste (notification for waste from offsite generators and equivalent information from onsite generators).

7.2 Processes for Ignitable, Reactive, and Incompatible Waste

The LLBG accepts ignitable, reactive, or incompatible waste (refer to Section 1.2). Pre-shipment review and/or chemical screening requirements in Section 2.0 are used to identify whether the waste is ignitable, reactive, or incompatible. The LLBG waste acceptance criteria identifies certain management requirements for ignitable, reactive, and incompatible waste, ensuring the waste is stored in a safe manner. Precautions are taken when ignitable, reactive, or incompatible waste is stored within the LLBG.

7.3 Provisions for Complying With Federal and State Land Disposal Restriction Requirements

State-only and federal LDR requirements restrict the land disposal of certain types of waste subject to *Resource Conservation and Recovery Act* (RCRA) *of 1976* and the *Hazardous Waste Management Act of 1976*. Waste managed on the Hanford Facility falls within the purview of these LDRs per 40 CFR 268 and WAC 173-303-140. Waste constituents that are subject to LDRs are identified in 40 CFR 268.40 and referenced by WAC 173-303-140. Waste must meet certain treatment standards, as specified in 40 CFR 268 and/or WAC 173-303-140, if the waste is to be land disposed.

Generators determine if LDRs apply to the mixed or dangerous waste based on knowledge or testing [40 CFR 268.7(a)]. Each waste is analyzed for those LDR constituents contained in the listed and characteristic waste numbers identified by the generator, including any UHC identified by 40 CFR 268.2(i), if the knowledge of the generator is not sufficient to make a determination. If the LDR waste does not meet the applicable treatment standards, the generator provides waste information with each shipment stating so in accordance with WAC 173-303-380(1)(j),-(k),-(l),-(m),-(n), or -(o). If the waste meets the LDR standards, the generator must send a certification that the waste meets the treatment standards.

7.3.1 Waste Treatment

Waste is treated to meet LDR as specified in 40 CFR 268 and WAC 173-303-140 with the exception of mixed waste designated by the Secretary of Energy for a disposal facility pursuant to the *Land Withdrawal Act*, as amended.[2] Mixed waste is treated to the applicable standards required by the disposal facility or

[2] Subject to "*State of Washington v. Bodman,*" presently on appeal before the United States Court of Appeals for the Ninth Circuit, No. 06-35227.

other applicable requirements. The LLBG potentially can partially treat or pre-treat certain waste before shipment to a permitted offsite facility that could perform full treatment of the specific waste to meet LDR treatment requirements. Waste requiring treatment other than what the LLBG can provide is repackaged, labeled, and transferred to a TSD unit for storage pending identification or development of an appropriate treatment. Prior to treatment of waste, the LLBG will have in place processes to ensure safe waste treatment as defined in Section 1.1.3 of this WAP. When characteristics of the waste are changed as a result of treatment or other processing, documentation will be entered into the unit-specific operating record. Dangerous waste is shipped to an offsite TSD for treatment.

When evaluating the treatability of certain characteristic waste, consideration must be given to any additional UHCs that might be found in certain characteristic waste. The treatment standards, for the most part, are concentration-based. When the concentration-based standards are used, the constituent concentrations for the waste must fall below those specified in 40 CFR 268.40 and/or 268.48 for UHCs and in WAC 173-303-140 for land disposal without treatment. If the concentrations exceed these limits, the waste must be treated before disposal. The alternative treatment standards for hazardous debris as specified in 40 CFR 268.45 or for contaminated soil as specified in 40 CFR 268.49, or for labpacks in 40 CFR 268.42(c) could also be used.

Treatment is performed in the LLBG as described in the Part A. Treatment of mixed waste within the trench cannot be performed directly on the working surface. Concrete pads, blocks, or other approved methods can be utilized to elevate the mixed waste off of the working surface.

Treatment of state-only extremely hazardous waste (WT01, WP01, and WP03) is performed in accordance with Revised Code of Washington (RCW) 70.105.050(2) for mixed waste and/or WAC 173-303-140(4)(a) for dangerous waste as applicable.

Waste managed at the LLBG is treated to meet either concentration-based treatment standards or technology-based standards. The alternative treatment standards for hazardous debris as specified in 40 CFR 268.45 or for contaminated soil as specified in 40 CFR 268.49 also could be used. When dealing with multiple dangerous waste numbers, both standards could apply, requiring a treatment train for ultimate compliance to LDR. In most cases, stabilization treatment is at the end of the treatment train. In some instances, as with the cementing process, treatability studies could be performed to ensure that when the waste is treated, LDR requirements are met.

Grab samples are collected on each batch of concentration-based treated waste to ensure that the treatment process was successful. For specified technologies, the LLBG operating record contains information to demonstrate the treatment process was well designed and well operated.

7.3.2 Sampling and Analytical Methods

Section 3.3 defines the parameters and methods needed to demonstrate compliance to LDR treatment standards. It is recognized that ALARA concerns may warrant modifications to the methods to ensure appropriate protection of personnel health and safety without impact to the method or sample integrity. Waste analyzed using SW-846 methods modified to address ALARA protection concerns are considered acceptable provided applicable data quality objectives can be met.

Samples of waste are transferred to the sample management area for packaging and transferred to an onsite laboratory or shipped offsite to a laboratory for analysis. Samples are collected in accordance with SW-846 and as described in Section 4.0. Storage is provided for waste containers while waiting laboratory analysis results.

7.3.3 Land Disposal Restriction Certification of Treatment

When LDR treatment has been completed and analytical results (if applicable per 40 CFR 268.40 and WAC 173-303-140) have verified the LDR treatment is successful, certification of the LDR treatment is required by the LLBG. The certification statement is prepared by the unit in accordance with 40 CFR 268.7b, d, and e. A copy of the certification is placed in the LLBG operating record.

When a LDR waste does not meet the applicable treatment standards set forth in 40 CFR 268.40 and WAC 173-303-140, or exceeds the application prohibition levels set forth in 40 CFR 268.32 or Section 3004(d) of RCRA, this information is placed in the LLBG operating record, in accordance with WAC 173-303-380(1)(k), (n), and -(o).

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8.0 RECORDKEEPING

Recordkeeping requirements applicable to this WAP are described in the *Hanford Facility RCRA Permit*, Attachment 33, General Information Portion, Table 12.1 (Ecology 2004) and this WAP.

The LLBG maintains the waste stream documentation or other approved processes, supporting documentation, and associated QA/QC data described in this WAP in accordance with the requirements in Permit Condition II.I (Ecology 2004).

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9.0 REFERENCES

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HNF-9921
Revision 5

T Plant Complex Waste Analysis Plan

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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EXECUTIVE SUMMARY

The T Plant Complex provides storage, treatment, and confirmation of dangerous waste, Waste Retrieval Project waste, and/or mixed waste from onsite generators, onsite Solid Waste Operations Complex-generated waste units, T Plant Complex-generated waste, or offsite generators (hereafter referred to as the 'generator' unless otherwise denoted in this waste analysis plan). The Solid Waste Operations Complex treatment, storage, and/or disposal units consist of Central Waste Complex, Waste Receiving and Processing Facility, Low-Level Burial Grounds, and T Plant Complex. This waste analysis plan provides processes to obtain information on the chemical, biological, and physical characteristics of the waste managed to meet the requirements of Washington Administrative Code 173-303-300, *General Waste Analysis*.

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CONTENTS

FIGURES

TABLES

ACRONYMS

ALARA	as low as reasonably achievable
AOAC	Association of Official Analytical Chemists
APHA	American Public Health Association
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Materials
CAP	corrective action plan
CCW	constituent concentrations in waste
CCWE	constituent concentrations in waste extract
COLIWASA	composite liquid waste sampler
CFR	Code of Federal Regulations
CWC	Central Waste Complex
DOE-RL	U.S. Department of Energy, Richland Operations Office
DQO	data quality objectives
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
HNF	Hanford Nuclear Facility (document identifier)
LDR	land disposal restriction
LLBG	Low-Level Burial Grounds
MSDS	material safety data sheet
NDE	nondestructive examination
NIOSH	National Institute for Occupational Safety and Health
PCB	polychlorinated biphenyl
PES	performance evaluation system
pH	negative logarithm of the hydrogen-ion concentration
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
RCW	Revised Code of Washington
SAP	sampling and analysis plan
SWOC	Solid Waste Operations Complex
T Plant	T Plant Complex
TCLP	toxicity characteristic leaching procedure
TPA or Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSCA	*Toxic Substances Control Act of 1976*
TSD	treatment, storage, and/or disposal

UHC	underlying hazardous constituents
WAC	Washington Administrative Code
WAP	waste analysis plan
WRAP	Waste Receiving and Processing (Facility)
WRP	Waste Retrieval Project

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	Meters	3.28084	feet
yards	0.9144	meters	Meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
Mass (weight)			**Mass (weight)**		
ounces (avoir)	28.34952	grams	Grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			**Volume**		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	Liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	Liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds (force) per square inch	6.894757	Kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Third Ed., 1990, Professional Publications, Inc., Belmont, California.

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T PLANT COMPLEX WASTE ANALYSIS PLAN

1.0 UNIT DESCRIPTION

The purpose of this waste analysis plan (WAP) is to document the waste acceptance process, sampling methodologies, analytical techniques, and overall processes that are undertaken for waste accepted for storage and treatment at the T Plant Complex (T Plant), which is located in the 200 West Area of the Hanford Facility, Richland, Washington. For a detailed description of the T Plant refer to T Plant, Chapter 1.0, "Part A Form", Chapter 2.0, "Facility Description and General Provisions", Chapter 4.0, "Process Information" (DOE/RL-95-36). Activities may be performed by the T Plant operating organization or its delegated representative.

1.1 Description of Unit Processes and Activities

T Plant is a nonland-based treatment, storage, and/or disposal (TSD) unit used for the treatment and storage of waste subject to the *Dangerous Waste Regulations*, Washington Administrative Code (WAC) 173-303. T Plant is an existing treatment and storage unit for dangerous and/or mixed waste. T Plant is a permitted containment building, miscellaneous unit, tank treatment and storage, container storage, and other treatment. The primary missions of T Plant are treatment of dangerous and mixed waste and storage of noncontainerized and containerized dangerous and mixed waste. Additional missions include decontamination of equipment and debris; identification, verification, sampling, treatment, and repackaging of dangerous, mixed, and Waste Retrieval Project (WRP) waste; repair and preparation of equipment to be returned to service; and demonstration of new treatment technologies. The 221-T Tank System, which includes the 211-T collection sump, tank 6-1 in canyon cell 6L, tank 5-7 in canyon cell 5R, tanks 5-6 and 5-9 in canyon cell 5L, tank 11-R in canyon cell 11R, and tank 15-1 in canyon cell 15R, is identified for closure. The 2706-T Tank System includes two active tanks (T-XX-2706-220 and tank T-XX-2706-221) and ancillary equipment located in the 2706-T, 2706-TA, 2706-TB Buildings. Ancillary equipment is defined in WAC 173-303-040. The tanks are located in the 2706-TB Building. The 2706-T Tank System has been placed in a standby status pending future tank treatment and storage missions.

T Plant consists of the 221-T Building, 221-T R-5 waste storage area, 2706-T treatment and storage pad, 211-T cage, 211-T pad, 271-T cage, 214-T Building, treatment and storage pads, storage modules, 2706-T, 2706-TA, and 2706-TB Buildings, 2706-T yard, and various other indoor and outdoor treatment and storage pads and buildings. Additional description can be found in the T Plant Facility dangerous waste permit application, Part A, (DOE/RL-95-36, Chapter 1.0). Refer to Figure 1-1 and Figure 1-2 for additional information on unit processes.

T Plant is designed for opening, sorting, treating, repackaging, sampling, and physical/chemical screening to characterize retrieved[1] waste; and to verify the characterization of containers of mixed waste. Treatment of mixed waste includes deactivation (neutralization, cementing, absorption, and controlled reaction with water), stabilization (cementing, absorption, and encapsulation), and amalgamation; volume reduction of waste (i.e., supercompaction); and repackaging of waste.

Waste entering T Plant initially is segregated. Waste information on the physical nature of the waste also might be verified by nondestructive examination (NDE). The waste can be sorted in gloveboxes into compliant and noncompliant fractions. Field screening and sampling might be conducted within the

[1] For purposes of this WAP, retrieved waste is suspect mixed waste that was previously located in the Low-Level Burial Grounds and is being removed for transfer to another TSD unit.

gloveboxes to perform verification. Additional field screening or sampling could occur in these gloveboxes or outside of the gloveboxes to complete verification or assist in complete characterization of the waste. Noncompliant waste material also could be treated in the gloveboxes or other approved locations to meet land disposal restriction (LDR), 40 Code of Federal Regulations (CFR) 268 or other requirements. If sampling is necessary to verify treatment requirements, sampling is conducted in the gloveboxes or other approved locations. Compliant waste, treated waste, and waste awaiting future treatment is transferred out of T Plant.

1.1.1 Waste Acceptance, Movement, Processing, and Management

The T Plant uses waste tracking processes to ensure that the waste received at the T Plant matches the manifest or transfer papers, to ensure that the waste is tracked through the T Plant to final disposition, and to maintain the information required in WAC 173-303-380. Waste is tracked through processing such as segregation, repackaging, treatment, and/or intra-TSD unit transfers. The waste tracking process provides a mechanism to track waste through a uniquely identified container (refer to Figure 1-3). The unique identifier is a barcode (or equivalent) that is recorded in an electronic data tracking system. This mechanism encompasses waste acceptance, movement, processing, and management of waste. When a new container is used, identification numbers are assigned and maintained as the waste moves through T Plant. The container identification number allows the T Plant to link to hard copy or electronic copy of records that are maintained as part of the operating record to retain information on the location, quantity, and physical and chemical characteristics of the waste.

The following sections and Figure 1-1 and Figure 1-2 describe the process for waste acceptance and different types of information and knowledge reviewed/required during the acceptance process. The process for management of waste is described in Chapter 4.0.

1.1.1.1 Narrative Process Descriptions

Waste that meets applicable LDR requirements, as specified WAC 173-303-140, which incorporates by reference 40 CFR 268, is stored at the T Plant. Mixed waste that does not meet LDR requirements, as specified in 40 CFR 268 and WAC 173-303-140, is stored until the waste is processed for repackaging or further treatment at the T Plant or another approved location. The T Plant operating record contains information necessary to meet LDR requirements (Sections 2.1.3.2 and 7.3). Containerized waste that is not fully characterized or is awaiting analytical results can be stored at the T Plant as well. The Hanford Facility is required to test certain mixed wastes when treatment standards are expressed as a concentration to ensure that the waste or treatment residues are in compliance with applicable LDR requirements (Section 2.1.3.2 and 7.3). Such testing is performed according to the frequency specified in this WAP, as specified in 40 CFR 268.7(b), incorporated by reference by WAC 173-303-140.

1.1.1.2 Waste Acceptance Process

The waste acceptance process for the T Plant consists of following activities:

- Waste Stream Approval. The generator provides information concerning each waste stream on a waste profile sheet. The waste stream information is reviewed against the T Plant waste acceptance criteria. If the waste stream information is sufficient and meets the applicable acceptance criteria, the waste stream is approved. In addition, the initial verification frequency for the waste is determined in accordance with the requirements found in the performance evaluation system (PES) program (Section 1.1.1.3). For a more complete description of the waste stream approval process, refer to Section 2.1.1.

- Waste Shipment/Transfer Approval. The generator provides specific data for each waste container on the container data sheet. The container data are reviewed against the waste profile sheet data and the T Plant acceptance criteria before being approved for shipment/transfer. In addition, the T Plant determines if any of the containers require verification based on the verification frequency as determined by the PES. For a more complete description of the waste shipment/transfer approval process, refer to Section 2.1.2.

- Verification. All waste streams are subject to receipt inspection during the waste shipment acceptance process. The percentage of the waste stream selected for physical and/or chemical screening is determined in accordance with the requirements found in the PES program (Section 1.1.1.3). Containers are opened and verified visually or by NDE. Of those containers subjected to physical screening, a percentage is subject to chemical screening via field or laboratory analysis. All information and data are evaluated to confirm that the waste matches the waste profile and container data/information supplied by the generator.

1.1.1.2.1 Waste Acceptance Process Between Solid Waste Operations Complex TSD Units

Waste transfers between Solid Waste Operations Complex (SWOC) TSD units could be necessary to support Hanford Site goals. In these instances a waste stream profile, or other approved processes that already has been developed, may be used to support these activities. A container may be transferred between SWOC facilities to accommodate the verification activities. A documented review is required to ensure compliance with the T Plant waste acceptance criteria. All waste transfers and containers are subject to receipt inspection. For waste that has not been accepted at CWC, LLBG, WRAP, or T Plant Complex TSD units; physical and or chemical screening will be completed as described in Sections 3.1, 3.2, and 3.3. The individual container data, inclusive of all knowledge obtained on the waste is compared to the T Plant waste acceptance requirements. Previously accepted waste that has not been considered for verification will be verified prior to transfer between SWOC TSD units. For a more complete description of the transfer process, refer to Section 2.3.

1.1.1.2.2 Types of Knowledge

When collecting documentation on a waste stream or container, the T Plant must determine if the information provided by the generator meets the definition of knowledge in WAC 173-303-040. Knowledge requirements are met by sampling and analysis, and/or process knowledge. Process knowledge consists of detailed information from existing published or documented waste analysis data or studies on processes similar to those that generated the waste, including but not limited to the following:

- Mass balance from a controlled process that has a specified input for a specified output
- Material safety data sheets (MSDSs) on unused chemical products
- Test data from a surrogate sample
- Analytical data on the waste or a waste from a similar process.
- Interview information
- Logbooks
- Procurement records
- Qualified analytical data
- Processes and/or methods
- Process flow charts
- Inventory sheets
- Vendor information
- Mass balance from an uncontrolled process (e.g., spill cleanup)

- Mass balance from a process with variable inputs and outputs (e.g., washing/cleaning methods).

This information will be sufficient to quantify constituents and characteristics to safely manage in compliance with T Plant acceptance criteria and WAC 173-303. The T Plant acceptance criteria is defined as the requirements found in this WAP and the associated T Plant dangerous waste permit application Part A.

1.1.1.3 Description of Performance Evaluation System (PES)

The PES acting as an agent of T Plant determines the initial physical screening frequency of each waste stream. PES provides a periodic status of an individual generator's performance for waste received. PES provides a mechanism for determining corrective actions, resolving waste acceptance issues, and physical screening frequency adjustments when a conformance issue has been discovered for newly generated waste.

1.1.1.3.1 Initial Physical Screening Frequency Determination

The initial physical screening frequency is determined based on the following process.

- Personnel responsible for waste receipt at the T Plant review the generator waste profile information to determine the relative potential for misdesignation or inappropriate segregation based on all relevant information, including any previous experience with the generator. Based on this review, any concerns are identified associated with the following criteria:
  - documented waste management program
  - waste stream characterization information
  - potential for inappropriate segregation.

- Based on the identification of concerns during the review, an initial physical screening frequency is established for the new generator's waste stream based on the following criteria:
  - Initial physical screening frequency of, at a minimum, 20 percent: No concerns identified (e.g., cleanup of contaminated soil where the soil has been well characterized and no other waste generation processes are occurring at that location)
  - Initial physical screening frequency of, at a minimum, 50 percent: Concern(s) identified in one criterion
  - Initial physical screening frequency of 100 percent: Concerns identified in two or more criteria.

1.1.1.3.2 Performance Evaluation

A performance evaluation is used to trend a generator's waste acceptance performance and is used to adjust the generator's overall physical screening frequency. This evaluation, identified as an integral part of the QA program, is objective and considers the conformance issues documented during the Preshipment Review and Verification functions. The PES maintains processes that: (1) perform evaluations based on conformance issues identified, (2) evaluate unsatisfactory performance for corrective actions, and (3) adjust physical screening rates accordingly.

The performance evaluation is conducted and subsequently accepted by PES team, and the documentation maintained in accordance with Section 8.0. Performance evaluation frequency is based on the generators historical performance and the waste stream in involved.

1.1.1.3.3 Conformance Issue Resolution

Conformance issues could result in a waste container that does not meet the T Plant waste acceptance criteria. A conformance issue is any discrepancy identified during the confirmation process with waste package documentation, a waste package, or a shipment. Discrepancies can be identified during preshipment reviews of waste streams during the verification process. If a possible conformance issue is identified, the following actions are taken to resolve the issue.

- The PES compiles all information concerning the possible conformance issue(s).

- The generator is notified and requested to supply additional knowledge that may assist in the resolution of the concern(s). If the generator supplies information that resolves the concern(s) identified, no further action is required.

- On determination that a conformance issue has been identified during verification, the T Plant personnel and the generator discuss the conformance issue and identify the appropriate course of action to resolve the container in question, e.g., pick another sample set, return the container, divert the container to another TSD unit that can accept the container and resolve the issue, or the generator resolves the issue at the T Plant. If the conformance issue(s) results in a waste stream failure, the physical screening frequency for all waste streams that have the potential to exhibit a similar conformance issue from the generator are adjusted to 100 percent for the next shipment until the issue(s) can be adequately addressed.

- The T Plant requests the generator to provide a corrective action plan (CAP) that clearly states the reason for the failure and describes the actions to be completed to prevent recurrence. The generator could request a reduction in verification of unaffected streams. This request must be accompanied by a justification that identifies why this stream(s) would not exhibit the same conformance issue.

- The T Plant reviews the CAP and stream justification for adequacy. If the CAP is inadequate, the generator remains at a physical screening rate of 100 percent. If the stream justification is adequate, the T Plant could provide an alternative frequency as denoted in Section 1.1.1.3.2.

1.1.1.3.4 Process for Reducing the Physical Screening Frequency

Physical screening (Section 2.2.2) rate frequencies and changes to those frequencies could be applied to a specific waste stream, to a specific contractor, or to a specific offsite generator based on the circumstances surrounding the conformance issue. After the initial physical screening frequency for a given waste stream has been established or increased, the physical screening frequency can be reduced in accordance with the following process.

The physical screening frequency is reduced in three steps. Reduction for all steps is based on the ability to demonstrate that five containers from the waste stream in question pass verification. In addition, reduction to the minimum frequency requires that the T Plant documents an acceptable evaluation of the corrective action plan. At no time will the physical screening frequency be reduced below 5 percent for waste generated onsite or below 10 percent for offsite generators.

Step 1) Reduce frequency by up to 66 percent after five containers from the waste stream in question pass verification.

Step 2) Reduce frequency established in Step 1 by up to 50 percent or to the minimum allowable whichever results in a greater frequency after five containers from the waste stream in question pass verification.

Step 3) Reduce frequency established in Step 2 to the minimum allowable after five containers from the waste stream in question pass verification. The T Plant documents an acceptable evaluation of the corrective action plan.

The physical screening rate reduction is established during periodic PES team evaluations, and the documentation is maintained according to Section 8.0 of this WAP. The percentage of the reduction is based on the evaluation of the relative severity of the original conformance issue, the status of the corrective action plan, any interim actions taken by the generator, the generator's performance for this waste stream before this reduction, and/or other factors deemed relevant.

1.1.2 Operating Conditions

The T Plant shall ensure that all waste management operations are conducted in accordance with design and engineering requirements of waste management structures and equipment, and with all equipment manufacture specifications and operating processes. Before treatment and/or storage of waste, the T Plant shall have processes in place to ensure safe management of the waste. These processes shall consider actual or potential risks posed by the waste and treatment and/or storage equipment. The T Plant shall conduct all waste treatment and/or storage according to these processes and comply with labeling, container management, and inspection requirements of WAC 173-303-630.

1.2 Identification and Classification of Waste

Dangerous and mixed waste is accepted for storage and/or treatment in the T Plant except for the following waste types:

- Bulk liquid waste in tankers
- Bulk solids in trucks or roll-off boxes
- Shock sensitive waste
- Class IV oxidizer waste
- Infectious waste.

Refer to Chapter 4.0 for precautions that are taken when ignitable, reactive, or incompatible waste is stored.

The T Plant manages the following waste types:

- Containerized liquids/free liquids
- Pressurized gas cylinders and aerosol cans
- Munitions/explosives (to be evaluated on a case-by-case basis)
- Bulk sodium metal
- Labpack liquids
- Solids/debris
- Sludges/soils.

These waste types could be classified as WRP, mixed, and/or dangerous. Unless otherwise prohibited by this WAP, the waste could exhibit the characteristics of ignitable, toxic, corrosive, and/or reactive.

In addition to the waste received at the T Plant for storage and/or treatment, the T Plant generates mixed and dangerous waste. This waste material consists of items such as, but not limited to, personal protective equipment (PPE), rags, and spent equipment contaminated with dangerous cleaning agents, lubricants, paints, or other dangerous materials that designate as dangerous wastes when discarded. Process knowledge, field screening, or sampling and analysis are used as appropriate to characterize these waste materials. Field screening and sampling are in accordance with this WAP and occur at the point of waste generation or at the location where the waste materials are stored.

Biological waste received from generators could consist of animal remains that were used for experiments. This type of waste is analyzed using NDE or visual examination.

1.2.1 Dangerous Waste Numbers, Quantities, and Design Capacity

The T Plant Part A identifies dangerous waste numbers, quantities, and design capacity.

Waste is designated pursuant to WAC 173-303 using manufacturer's product information, MSDS, laboratory analysis, and reference material such as *Registry of Toxic Effects of Chemical Substances* (NIOSH). Waste also is characterized in accordance with the requirements of 40 CFR 761.

Designation for Waste Types Reprocessed at T Plant:

Number	References
U and P numbers	WAC 173-303-9903-9904
F numbers	WAC 173-303-9904
WPCB	WAC 173-303-9904
D001	WAC 173-303-090(5)
D002	WAC 173-303-090(6)
D003	WAC 173-303-090(7)
D004 through D043	WAC 173-303-090(8)
WT01 and WT02	WAC 173-303-100 and 104
WP01, WP02, and WP03	WAC 173-303-100 and 104
WSC2	WAC 173-303-090(6)/104

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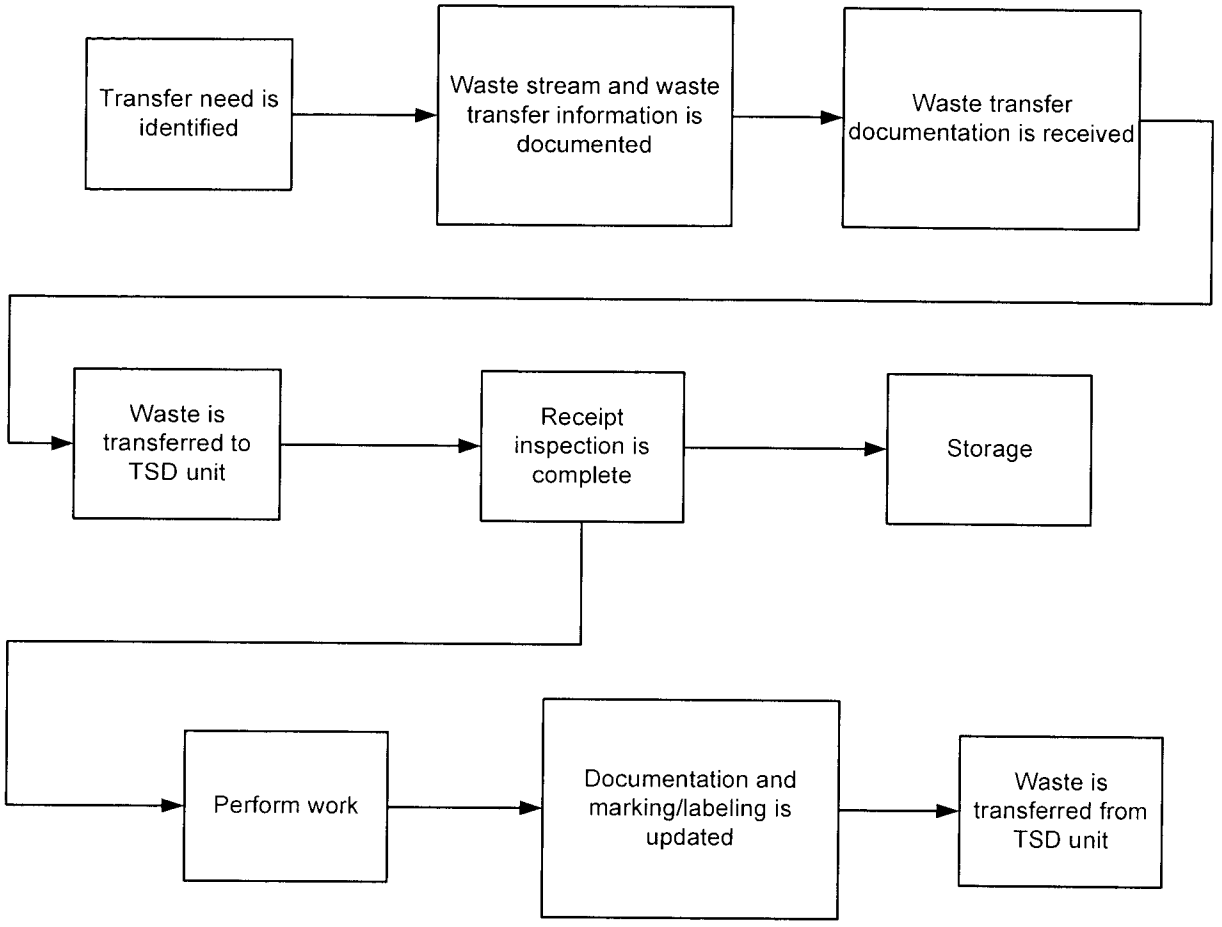

Figure 1-1. Waste Transfers Between Solid Waste Operations Complex TSD Units.

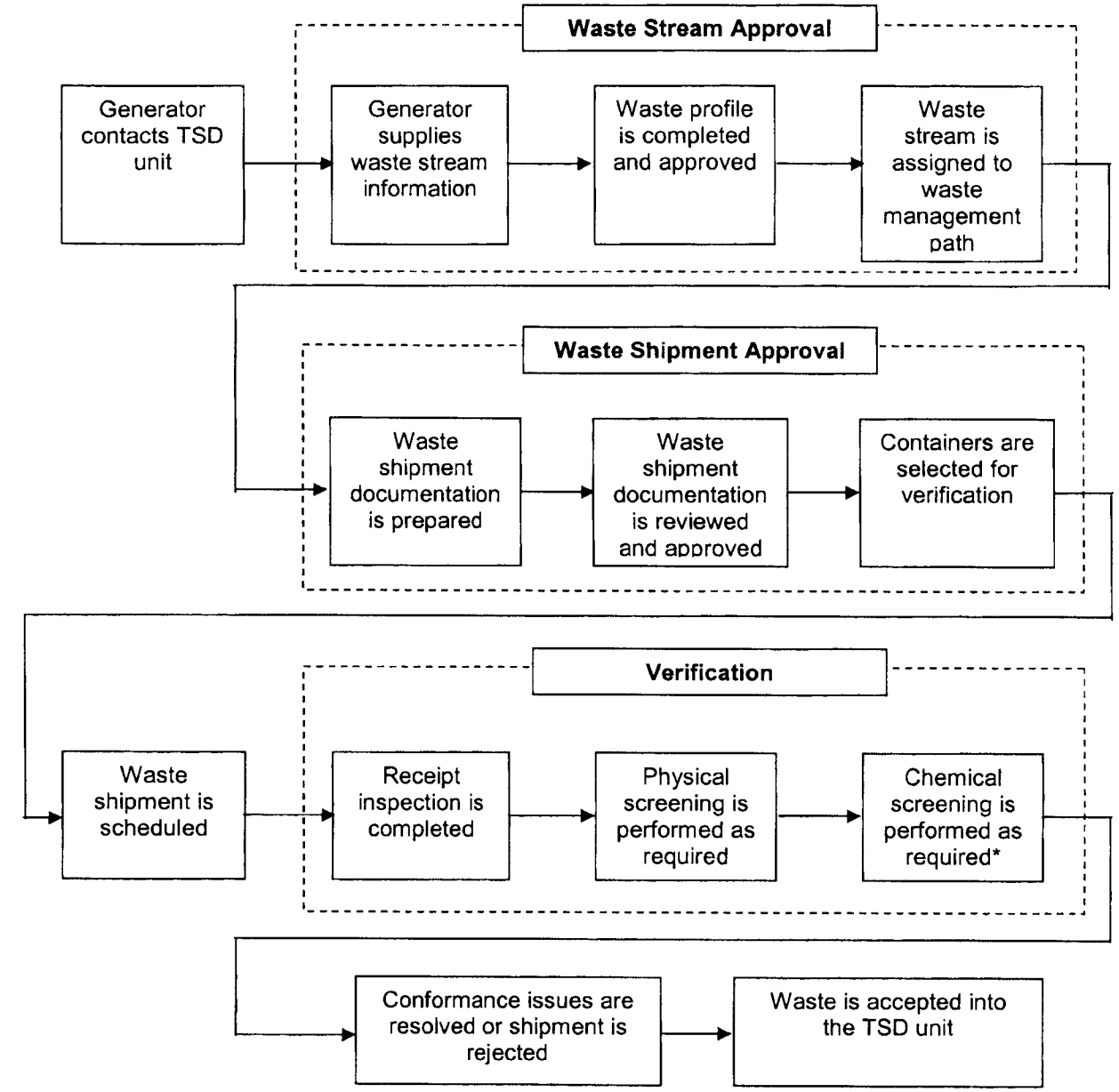

Figure 1-2. Waste Confirmation and Acceptance Process for Newly Generated Waste.

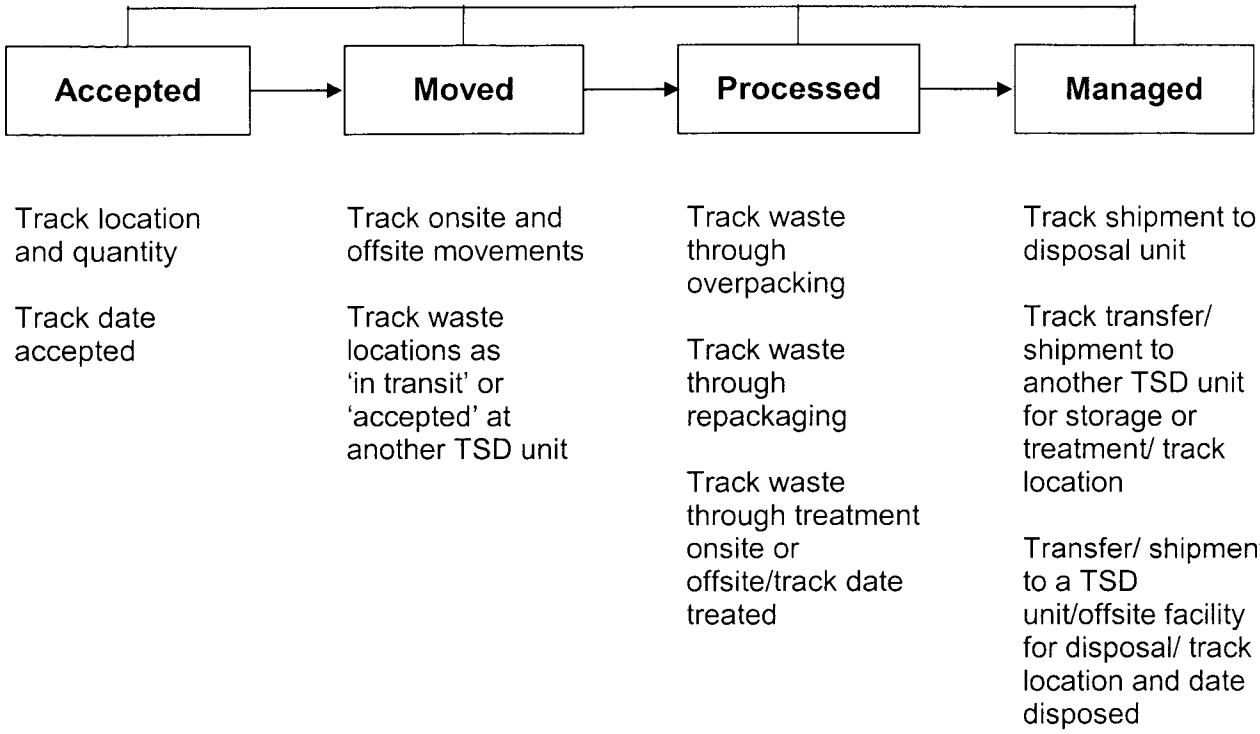

Figure 1-3. Waste Tracking.

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2.0 CONFIRMATION PROCESS

The confirmation process used to meet WAC 173-303-300 requirements includes completing appropriate pre-shipment reviews and verification steps and/or parameters as described in this section and indicated on Figure 2-1. The confirmation process for onsite generators and offsite generators is detailed in Section 2.1 and 2.2 for SWOC-generated waste is detailed in Section 2.8, WRP waste is detailed in Section 2.7 and for T Plant -generated waste is detailed in Section 2.8.

2.1 Pre-Shipment Review

Pre-shipment review takes place before waste can be scheduled for transfer or shipment to T Plant. The review focuses on whether the waste stream is defined accurately, meets the T Plant waste acceptance criteria, and the LDR status is determined correctly (for mixed waste subject to LDR treatment standards refer to Section 7.3.1). Only waste determined to be acceptable for storage and/or treatment is scheduled. This determination is based on the information provided by the generator. The pre-shipment review consists of the waste stream approval and waste shipment approval process. The following sections discuss the pre-shipment review process. The information obtained from the generator during the pre-shipment review, at a minimum, includes all information necessary to safely store and/or treat the waste. The pre-shipment review ensures the waste has been characterized for purposes of evaluation against the T Plant waste acceptance criteria, and that the data provided qualify as 'knowledge' (Section 2.1.3).

2.1.1 Waste Stream Approval Process

The waste stream approval process consists of reviewing waste stream information supplied on a waste stream profile or other approved processes and attached analysis. At a minimum, the waste stream profile or other approved processes requests the following information:

- Generator information (e.g., name, address, point-of-contact, telephone number)
- Waste stream name
- Waste generating process description
- Chemical characterization information (e.g., characterization method(s), chemicals present, concentration ranges)
- Designation information
- For mixed and dangerous waste (WRP waste is excluded) LDR information including identification of underlying hazardous constituents (UHCs) if applicable
- Waste type information (e.g., physical state, absorbents used, inert materials, stabilizing agents used)
- Packaging information (e.g., container type, maximum weight, size)
- Attachments could consist of container drawings, process flow information, analytical data, etc.

This information is reviewed against the T Plant waste acceptance criteria to ensure the waste is acceptable for receipt. If conformance issues are found during this review, additional information is requested that

could include analytical data or a sample to be analyzed. If the waste cannot be received, the T Plant will pursue acceptance of the waste at an alternative TSD unit or request the generator to pursue acceptance at an offsite facility or another approved facility.

On determination that the waste is acceptable for receipt at the T Plant, the T Plant assigns the waste on the profile or other approved processes to a waste management path and establishes a waste verification frequency based on the PES requirements found in Sections 1.1.1.3 and 2.2.3.1.

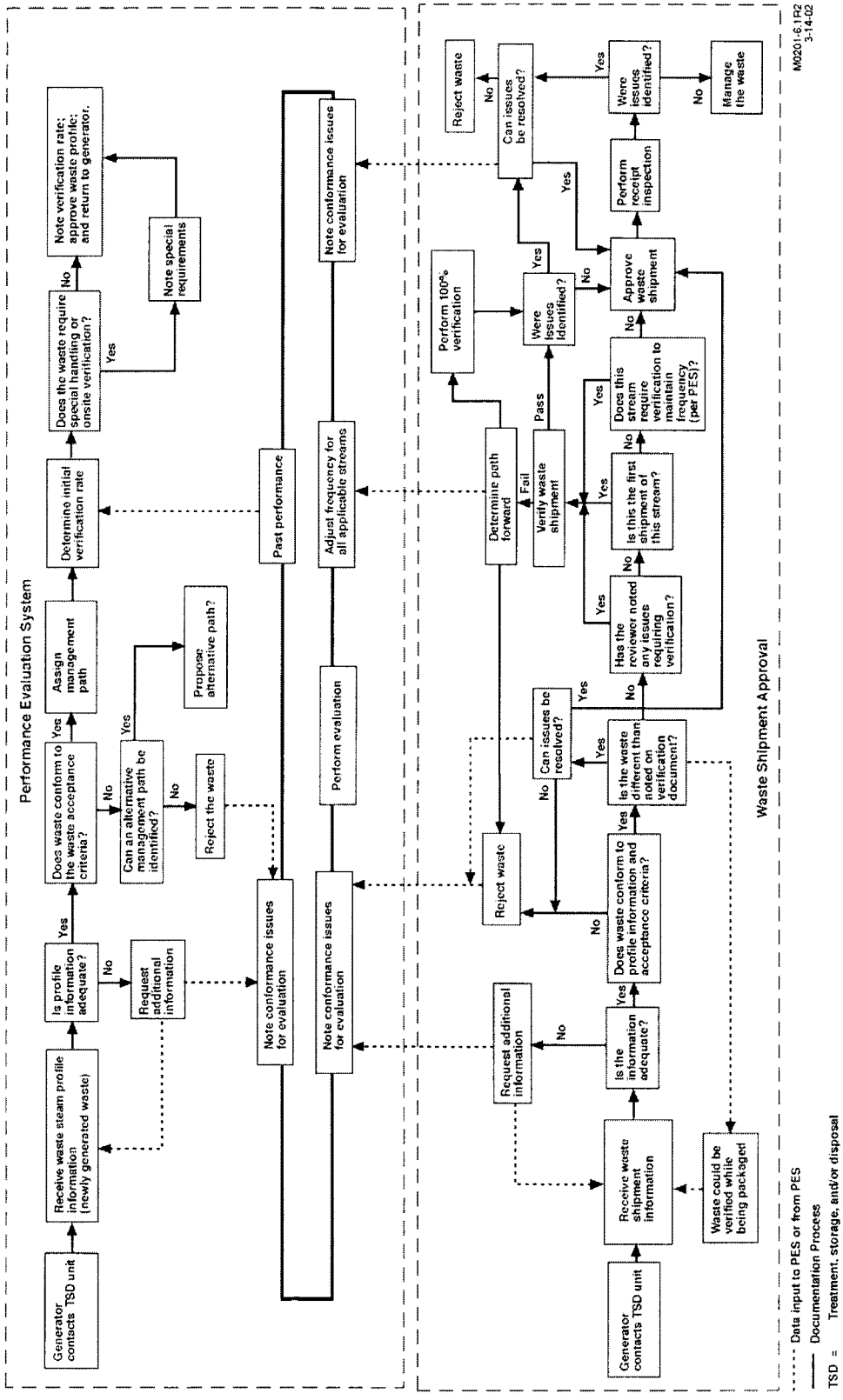

Figure 2-1. Waste Acceptance Process.

2.1.2 Waste Shipment Approval Process

For each waste transfer or shipment that is a candidate for storage and/or treatment, the generator provides the following information:

- Container identification number
- Profile number or other approved processes (except for waste transfers of previously accepted waste)
- Waste description
- Generator information (e.g., name, address, point-of-contact, telephone number)
- Container information (e.g., type, size, weight)
- Waste numbers
- Designation as extremely hazardous waste or dangerous waste
- Waste composition
- Packaging materials and quantities.

The pertinent information is entered into a solid waste information tracking system.

Where potential conformance issues exist in the information provided, (e.g., waste characteristics do not match the waste profile information, T Plant waste acceptance criteria, or additional constituents are expected to be present that do not appear on the documentation), the generator is contacted (if available) by the T Plant for resolution. Refer to Section 6.0 for discussion on repeat and review frequency.

For each container, a technical review is performed. WRP waste containers will follow an approved process (Section 2.7). Other reviews such as physical screening determination and chemical screening determination are defined in Section 2.2.2 and 2.2.3. Technical review is as follows:

- **Technical review.** The individual container data are compared to the waste profile or other approved process data to ensure the waste to be shipped to the T Plant is as described by the waste profile. Every transfer is reviewed to ensure the waste meets the T Plant waste acceptance criteria.

  Based on waste identification information provided, the waste designation is reviewed to ensure compliance with waste designations per WAC 173-303-070 through -100, as well as evaluating whether the waste meets the T Plant waste acceptance criteria.

  If the transfer or shipment information is found to be acceptable, the T Plant determines if any of the waste containers will be physically or chemically screened. WRP waste will be physically and/or chemically screened as determined by the WRP Program.

2.1.3 Knowledge Requirements

The T Plant ensures that all information used to make waste management decisions will be based on the requirements found in the following sections. Information determined to be 'knowledge' must meet the definition of 'knowledge' provided by WAC 173-303-040.

2.1.3.1 General Knowledge Requirements

Adequate knowledge requires (1) general waste knowledge requirements, (2) LDR waste knowledge requirements, and/or (3) waste knowledge exceptions.

(1) **General Waste Knowledge Requirements for Designation and Waste Management**. At a minimum, the generator supplies enough information for the waste to be treated and/or stored at T Plant. The minimum level of knowledge consists of designation data where the constituents or knowledge of the waste's generating source (in the case of wastes potentially from listed sources) causing a dangerous waste number to be assigned are quantified, and that data addresses any T Plant operational parameters necessary for proper management of the waste.

When process knowledge indicates that constituents, which if present in the waste might cause the waste to be regulated, are input to a process but not expected to be in the waste, sampling and analysis can be performed to ensure the constituents do not appear in the waste above applicable regulatory levels. This requirement can be met through chemical screening. This sampling and analysis is required only for initial characterization of the waste stream.

When the available information does not qualify as knowledge or is not sufficient to characterize a waste for management, the sampling and testing methods outlined in WAC 173-303-110 are used to determine whether a waste designates as ignitable, corrosive, reactive, and/or toxic, and the sampling and testing methods will be used as applicable to determine whether the waste contains free liquids. If the analysis is performed to complete characterization after acceptance of the waste by the T Plant, then this WAP governs the sampling and testing requirements.

(2) **Waste Knowledge Requirements for LDR Compliance.** Waste is stored at the T Plant while awaiting analytical results for LDR requirements. The T Plant portion of the operating record contains all information required to document that the appropriate treatment standards have been met or the treatment required to meet the LDR treatment standards, unless otherwise specified in this section.

For the purposes of this WAP, a representative sample is required to demonstrate compliance with a concentration-based treatment standard (refer to Section 4.0). Corroborative testing for the sample could be accomplished in the following manner.

- Generators could use onsite laboratories or other laboratories to obtain data that could be used as basis to certify that the waste meets concentration-based LDR treatment standards. For waste that must meet method based LDR treatment standards, information must be supplied on the treatment methods necessary to meet LDR requirements and comply with WAC 173-303-380(1)(j),-(k),-(n), and -(o).

- The T Plant uses these analytical data to meet applicable requirements found in WAC 173-303-140(4).

(3) **Waste Knowledge Exceptions**. The T Plant is designed to provide information necessary to further disposition the waste (e.g., repackage, designate, segregate, sample, and analyze). The T Plant shall ensure sufficient information is available (D001, D002, D003, and incompatibility) and operation safeguards are in place to safely process waste. If sufficient information is not available, the waste will enter the discrepant container management process described in Section 2.5 in order to obtain the necessary information.

2.1.3.2 Methodology to Ensure Compliance with Land Disposal Restrictions Requirements for Mixed and Dangerous Waste

All generators of mixed and dangerous waste are subject to LDR requirements and are required to submit all information notifications and certifications described in WAC 173-303-380(1)(j),-(k),-(n), and -(o).

Mixed and dangerous waste not meeting the treatment standards, but meeting the T Plant waste acceptance criteria, can be stored at the T Plant (refer to Section 1.1.1.1). The following are general requirements for offsite notifications or onsite information and supporting documentation.

- The waste is subject to LDR and the generator has treated the waste. The generator supplies the appropriate LDR certification information (WAC 173-303-140).

- The waste is subject to LDR and the generator has determined that the waste meets the LDR for disposal. The generator develops the certification based on process knowledge and/or analytical data and supplies the appropriate LDR certification information necessary to demonstrate compliance with the LDR treatment standards of WAC 173-303-140. State-only LDRs do not require this type of certification.

- The waste is subject to LDR and requires further treatment to meet applicable treatment standard.
  - The generator supplies additional information concerning the waste and details any treatment necessary to meet applicable treatment standards.
  - If waste is treated to meet state-only or federal LDRs at the T Plant, the T Plant prepares information necessary to meet WAC 173-303-380(1)(k) (refer to Section 7.3).

A representative sample of the waste must be submitted for analysis to ensure that concentration-based LDR treatment standards are met. This sample could be taken by the T Plant or the generator, and is required to comply with the treatment standards contained in 40 CFR 268.40 and 268.48 for UHCs.

2.1.4 Additional Requirements for Tank System Pre-Transfer/Shipment Review

Additions to the 2706-T Building Tank System are evaluated by T Plant using technical assessments, sampling, and characterization to ensure chemical compatibility and to ensure that the waste acceptance criteria for the tank system are satisfied.

2.1.4.1 Tank Waste Assessment

Assessments are performed during the work planning stage on liquid waste added directly and chemicals expected to be associated with the equipment/material for decontamination/treatment as well as the agents (e.g., sodium hydroxide, etc) expected to be added to the 2706-T Building Tank System. These assessments address the following compatibility issues:

- Additions are compatible with the tank system.
- Additions to not create a chemical reaction with waste currently in the tank system.
- Additions do not exceed any of the maximum limits in the current waste stream profile sheet.
- Additions are consistent with the acceptance criteria of the receiving facility.

Additions that involve dangerous, mixed, or WRP waste are identified the T Plant Complex dangerous waste permit application, Part A (DOE/RL-95-36, Chapter 1.0).

2.1.4.2 Sampling and Characterization

Characterization of substances before addition to the 2706-T Building Tank System is required to ensure that an accurate chemical compatibility assessment can be performed. The characterization is obtained through process knowledge provided by the generator of the waste/materials/equipment being received and/or analysis of samples.

For the purposes of the 2706-T Building Tank System waste characterization, samples of the waste are taken as necessary (usually before transfer to a permitted TSD unit). The data obtained are used for evaluating operational systems and to prepare for transfer of the liquid waste. The frequency of sampling varies depending on the volumes and types of liquid entering the 2706-T Building Tank System and established operational controls. The physical and chemical parameters for verification are chosen based on the waste profile sheet, tank contents, and the waste acceptance criteria of the receiving facility.

2.1.4.3 Additional Acceptable Knowledge for the 2706-T Building Tank System

In addition to the process described previously, pre-transfer/shipment review characterization information requirements for the 2706-T Building Tank System must meet the acceptance criteria of the receiving facility. Because waste managed in the 2706-T Building Tank System could be transferred to Liquid Effluent Treatment Facility (LERF), 200 Area Effluent Treatment Facility (ETF), or the Double-Shell Tank (DST) System, or other receiving facilities, waste introduced into the 2706-T Building Tank System must not jeopardize the transfer of waste to the receiving TSD unit(s). Acceptable knowledge must be obtained on waste accepted in the 2706-T Building Tank System to facilitate the transfer of waste to a receiving facility.

2.1.5 Containment Building Waste Acceptance Requirements

The T Plant containment building is the 221-T Building that includes the railroad tunnel, canyon deck, and selected process cells [T Plant Complex dangerous waste permit application, Part A (DOE/RL-95-36, Chapter 1.0)]. The containment building acts as primary containment for stored waste and materials (generally equipment and debris) not in containers and not containing free liquids. The T Plant containment building is designed and operated in accordance with WAC 173-303-695, which incorporates by reference the requirement of 40 CFR 264, Subpart DD, "Containment Buildings". Generally, waste acceptance follows the same requirements as outlined in Section 2.1.3.1 of this WAP; however, other approved waste acceptance processes can be used to ensure that waste accepted into the containment building is acceptable for storage/treatment.

2.1.6 Miscellaneous Unit Waste Acceptance Requirements

The 2706-T and 2706-TA Buildings are used to treat, store, and decontaminate railroad cars, buses, trucks, automobiles, heavy equipment, process equipment, etc. Noncontainerized and containerized waste segregation, sampling, treatment, verification, and/or repackaging of waste boxes and containers also are conducted. Under miscellaneous unit provisions of this permit, these buildings also are permitted to store noncontainerized waste that could contain free liquids and to perform waste treatment and decontamination activities using free liquids on operational area floors. The 2706-T and 2706-TA Buildings each have the capability to perform different treatment processes simultaneously. Generally, waste acceptance follows the same requirements as outlined in Section 2.1.3.1 of this WAP. However, other approved waste acceptance processes can be used to ensure that waste accepted into the miscellaneous unit is acceptable for storage, treatment, and other approved activities.

2.2 Verification

Verification is an assessment performed by the T Plant to substantiate that the waste stream received at the T Plant is the same as represented by the analysis supplied by the generator for the pre-shipment review. Verification is performed on waste received by the T Plant. Verification includes container receipt and inspection. In addition, select containers could be subject to physical screening, and chemical screening. Waste is not accepted by the T Plant for storage and/or treatment until the required elements of verification have been completed, including evaluation of any data obtained from verification activities.

Documentation reviewed as part of verification activities could include manifest or onsite shipment document, container inventory documentation, a container listing report, visual verification records, screening analyses, and the waste profile.

All conformance issues identified during the verification process are resolved in accordance with Section 1.1.1.3.3.

Containers previously used to hold non-acute dangerous waste will be evaluated to determine if they are empty by using the following criteria: A container or inner liner is "empty" when all wastes in it have been taken out that can be removed using practices commonly employed to remove materials from that type of container or inner liner (e.g., pouring, pumping, aspirating, etc.) and, no more than one inch of waste remains at the bottom of the container or inner liner, or the volume of waste remaining in the container or inner liner is equal to three percent or less of the container's total capacity, or, if the container's total capacity is greater than one hundred ten gallons, the volume of waste remaining in the container or inner liner is no more than 0.3 percent of the container's total capacity.

The presence of free liquids which readily separate from the solid waste portion of dangerous waste may be determined by either the paint filter test or through NDE results.

2.2.1 Container Receipt Inspection

Container receipt inspection is a mandatory element of the verification process. Therefore, 100 percent of each shipment (including onsite transfers) is inspected at the T Plant for possible damage or leaks, complete labeling, and if present, tamper-resistant seals are intact (Sections 2.2.2 and 2.2.3). This is to ensure that the shipment: (1) is received at the T Plant in good condition, (2) is the waste indicated on the transfer or shipping papers, (3) has not been opened after physical and/or chemical screening was performed, and (4) is complete. When a conformance issue exists, a case-by-case determination is performed and the appropriate action is taken based on the severity of the issue. One of the following actions may be taken as appropriate, in response to a conformance issue:

- Implementation of the contingency plan (DOE/RL-94-02) per the *Building Emergency Plan for T Plant Complex* (HNF-IP-0263-TPC).

- Conformance issues where additional information is needed to safely manage the waste are resolved before verification continues.

- Continuation of verification for waste with conformance issues not meeting the above criteria.

2.2.2 Physical Screening Process

Physical screening is used as a verification element. This section describes the requirement pertaining to methods, frequency, and exceptions concerning the use of physical screening as a verification activity. Physical screening could be performed before the waste is shipped to the T Plant. When physical screening is performed at a location not within the SWOC TSD units, tamper-resistant seals are applied to each container when examined. Upon receipt at the T Plant, tamper-resistant seals are verified as intact to ensure that no changes could have occurred to the waste content. The requirements for adding and/or removing tamper-resistant seals are maintained through an established program. Documentation shall be maintained in the T Plant operating record.

Selection and interpretation of the appropriate physical screening method(s) are conducted by personnel who are trained as required by the *T Plant Complex Dangerous Waste Training Plan* (HNF-1272). Each

physical screening method is performed by trained personnel according to *T Plant Complex Dangerous Waste Training Plan* (HNF-1272).

2.2.2.1 Physical and Chemical Screening Determination

Processes must be maintained describing the activities for selecting containers for physical/chemical screening. Authoritative/directive means of selecting containers for physical/chemical screening are used based on the pre-shipment and/or waste stream review process. The selection is based on the contents listed in the associated shipment/waste stream documentation, the variation within and experience with the specific waste type.

Two criteria are used in making the selection. The first criterion is based on whether pre-shipment review activities (document and characterization review) identify areas of potential concern. The second criterion is reviewing the current physical screening percentage (calculated according to Section 2.2.2.3) of containers offered for receipt from said waste stream from said generator that have been offered over the past 12 months or the date of the last physical screening adjustment, whichever occurs last. The rate will be applied as compared to those that have been physically screened. This criterion ensures that the minimum physical screening rates required by this WAP are met.

The number of containers selected for physical screening per waste stream is determined by comparing the calculated percentage rate which is then adjusted according to the PES. This selected group of containers constitutes a sample set.

On determining whether the waste container(s) will be verified, the container(s) is scheduled for shipment.

2.2.2.2 Physical Screening Methods

The following physical screening methods, comply with the requirement to verify a waste.

1. Visual inspection (opening the container)
2. NDE.

Refer to Section 2.2.5 for QC pertaining to physical screening. (Refer to Section 3.1 for the criteria and rationale for choosing a physical screening method.)

Waste packaging that is witnessed by the T Plant or its representative at a non-SWOC location is considered to have met the physical screening requirements denoted in this WAP, provided that the program meets the requirements of WAC 173-303 and the witness is qualified to determine the waste meets acceptance requirements. On closure of the container, tamper-resistant seals must be applied to ensure the integrity of the contents.

2.2.2.3 Physical Screening Frequency

The minimum physical screening frequency is 5 percent for onsite generators, applied per waste stream per generator per year. For offsite generators, the minimum physical screening frequency is 10 percent per waste stream per generator per year. The T Plant adjusts the physical screening frequency for generators based on objective performance criteria (refer to Section 1.1.1.3.1).

If a container fails verification, the waste stream physical screening frequency will be raised to 100 percent with the next containers offered. Subsequent containers offered will be evaluated through the PES for verification rates, as described in Section 1.1.1.3 of this WAP.

2.2.2.4 Physical Screening Exceptions

The following are exceptions to the physical screening process outlined previously.

- Shielded, classified, and remote-handled mixed waste are not required to be physically screened; however, the T Plant performs a more rigorous documentation review and obtains the raw data used to characterize the waste (less than 1 percent of current waste receipts). For classified waste, it is necessary to have an appropriate U.S. Department of Energy security clearance and a need to know the information as defined by the classifying organization or agency.

- Waste that physically cannot be screened at the T Plant or an associated screening facility must be physically screened at the generator location [e.g., large components, containers that can not be opened, for as low as reasonably achievable (ALARA) purposes, or does not fit into a NDE unit]. Physical screening at the generator location consists of observing the packaging of the waste. If no location can be found to perform the physical screening, no screening is required.

- Waste that is packaged by a trained T Plant -delegated representative(s) is considered to have met the physical screening requirements as denoted within this WAP.

- Waste that has been packaged and physically screened at a SWOC TSD unit.

2.2.3 Chemical Screening Process

Chemical screening is used as a verification element. This section describes methods, frequency, and exceptions for chemical screening. Chemical screening could be performed before the waste is shipped to the T Plant. When screening is performed at a location not within the SWOC TSD units, tamper-resistant seals are applied to each container examined and, on receipt at T Plant, verified as acceptable to ensure that no changes could have occurred to the waste content. Processes are maintained by the T Plant detailing the requirements for adding and/or removing tamper-resistant seals. Documentation shall be maintained in the T Plant operating record.

Qualified personnel conduct selection and interpretation of chemical screening methods. Unless otherwise noted, tests are qualitative, not quantitative. The objective of screening is to obtain reasonable assurance that the waste generally consistent with the description on the shipping documentation. The following tests are selected depending on the waste matrix and the applicability of the method.

- pH
- Peroxide
- Oxidizer
- Water reactivity
- HOC (chlor-n-oil/water/soil)
- Headspace
- Sulfide
- Cyanide
- Paint filter.

Refer to Section 2.2.5 for QC information for chemical screening. Processes are maintained by the T Plant that define the basis for selecting screening tests.

2.2.3.1 Chemical Screening Frequency

At a minimum, 10 percent of the mixed or dangerous waste containers verified by physical screening (Section 2.2.2) must be screened chemically. T Plant obtains a representative sample, which could be a grab sample.

Small containers of waste (labpacks), not otherwise identified in the exceptions and packaged in accordance with 40 CFR 264.316, 40 CFR 265.316, and WAC 173-303-161 are screened chemically in accordance with the chemical screening frequency of the waste stream as determined by the PES team (Section 1.1.1.3). Inner containers are segregated by physical appearance. At least one container from each group (or three containers if all are similar) are screened chemically.

2.2.3.2 Chemical Screening Exceptions

The following are cases in which chemical screening is not required.

- Small containers of waste in overpacked containers (labpacks) packaged in accordance with WAC 173 303-161 and not prohibited under LDR specified in WAC 173-303-140
- Waste exempted from the physical screening requirements (Section 2.2.2.4)
- Commercial chemical products in the original product container(s) (e.g., off-specification, outdated, or unused products)
- Chemical containing equipment removed from service, (e.g., ballasts, batteries)
- Waste containing asbestos
- Waste, environmental media, and/or debris from the cleanup of spills or release of single substance or commercial product or otherwise known material (e.g., material for which an MSDS can be provided)
- Confirmed noninfectious waste (e.g., xylene, acetone, ethyl alcohol, isopropyl alcohol) generated from laboratory tissue preparation, slide staining, or fixing processes
- Hazardous debris as defined in WAC 173-303-040
- Other special cases could be exempted on a case-by-case basis.

2.2.4 Sampling for Confirmation Screening

Sampling is performed in accordance with WAC 173-303-110(2). A representative sample is obtained for chemical screening. The chemical screening methods described in Section3.0 do not require any sample preservation methods because the screening tests are performed at the time and location of sampling, or as soon as possible thereafter. During the interim period, the samples are stored in a manner that maintains chain of custody and protects the sample composition.

2.2.5 Quality Assurance and Quality Control for Confirmation Process

The following QA and QC elements are used by the T Plant to ensure confirmation activities provide sufficient data to provide an indication that waste received is as described in the shipping documentation. Physical/chemical screening methods shall have sufficient performance levels to yield valid decisions

when considering method variability (precision and accuracy). Data quality objectives have been established with Ecology in accordance with TPA Action Plan Section 6.5 (Ecology et al. 2003) and have been documented and reflected in this WAP. In addition, all screening equipment requiring calibrations shall be checked before use to ensure calibration dates are current and equipment is functioning properly. This check will be documented in equipment log books. Personnel performing screening activities are properly trained and current certifications are on record. During screening activities strict compliance with applicable industrial hygiene and safety standards is mandatory.

2.2.5.1 Physical Screening Quality Control

This section describes the QC used by T Plant to ensure that quality data are obtained when performing physical screening methods identified in Section 2.2.2, except visual inspection. Physical screening QC is used only to ensure that quality data are obtained when performing NDE. Visual inspection does not consist of the use of instrumentation or chemical tests. QC objectives for visual inspection are obtained through the appropriate training.

The following QC elements apply to NDE used for physical screening:

- A penetration test is performed when image data generating components are changed to document system capability has not changed.
- A resolution test is performed at the beginning of a shift. A shift ends when shutdown activities are performed. A shift can be up to 24-hours.
- A radiographer is qualified per SNT-TC-IA, Level II certification of American Society of Nondestructive Testing training.
- Examination must cover 100 percent of the waste in the container.
- At minimum annually, a capability demonstration is performed on a training drum.

2.2.5.2 Chemical Screening Quality Control

The following QC elements are used when performing chemical screening.

- Appropriate sample containers and equipment are used.
  - Containers and equipment of the appropriate size that are chemically compatible with the waste and testing reagents shall be used.
- Reagent checks
  - Water that is reagent grade and from a documented source shall be used.
  - Chemicals and test kits must be labeled so that these are traceable and documented in the T Plant operating record.
  - QC checks shall be performed on each lot of test kit and associated reagents and documented in the T Plant operating record, unless a more frequent period is specified in the test kit instructions.
  - Personnel performing chemical screening are adequately trained and current qualifications/certifications are on record.

2.3 Waste Transfers Between Solid Waste Operations Complex TSD Units

Transfers from the SWOC TSD units to the T Plant may be necessary to perform verification, obtain additional knowledge to support treatment/disposal, to make the waste amenable for long-term storage, or to perform treatment. A technical review is required to ensure compliance with the T Plant waste acceptance criteria. For waste that is being transferred from the SWOC TSD units TSD units to the T Plant, the following requirements apply.

2.3.1 Waste Stream Approval Process

The waste stream must already have been approved using the process described in Section 2.1.1. Waste knowledge exceptions apply as described in Section 2.1.3.1.

For retrieval of suspect-mixed waste streams from the LLBG, sufficient information must be available to further disposition the waste. Mixed waste containers are transferred out of the LLBG to T Plant or another TSD unit and ultimately received at WRAP or another approved TSD unit for packaging and/or treatment. The amount and type of data that exists for a given waste package vary widely and depend on the documentation requirements in effect when the waste was generated. The SWOC TSD unit is required to supply specific information about the waste package contents. A technical review of the records is performed as described in Section 2.3.2 and suspect dangerous waste items are identified. Suspect mixed or dangerous waste will be evaluated and managed for safe storage until a waste designation can be completed. Additionally, a visual inspection is performed on the containers before transfer.

2.3.2 Waste Transfer Approval Process

A technical review of documentation associated with each waste container in the shipment is performed to ensure the waste meets the T Plant waste acceptance criteria. The individual container data, inclusive of all knowledge obtained on the container is compared to the T Plant's waste acceptance requirements. If necessary, the waste management path (waste specification record) previously assigned to the waste stream is updated and re-labeling/remarking is completed before the transfer. Waste is tracked through processing at the T Plant in accordance with Section 1.1.1. When characteristics of the waste change as a result of treatment or other processing, documentation will be entered into the unit-specific operating record. As new information is obtained on the waste, the container is managed to any new requirements. Updates to container data during transfer and subsequent processing activities are reflected in solid waste information tracking system, documented, and maintained in accordance with Section 8.0.

2.3.3 Verification

For container receipt inspection, 100 percent of each transfer is inspected for damage and to ensure the waste containers are those indicated on the documentation. This activity is a mechanism for identifying any document conformance issues or damaged containers before receipt/acceptance. Conformance issues identified during receipt are managed as described in Section 2.2.1.

For physical/chemical screening, once waste has been verified, additional physical/chemical screening is not required.

2.3.4 Performance Evaluation System

The performance of the generator is evaluated and documented in accordance with the PES as described in Section 1.1.1.3. The PES is used to determine physical screening frequency and determine corrective

actions for conformance issues. The performance evaluation considers all newly-generated waste accepted at SWOC TSD units.

2.4 Waste Acceptance

Initial acceptance of waste occurs only after the confirmation process described in Section 3.2.0 is complete. Conformance issues identified during the confirmation process are documented and managed in accordance with Section 1.1.1.3.3. Conformance issues that must be corrected before waste acceptance include:

- Waste does not match approved profile documentation,
- Designation, physical, and/or chemical characterization discrepancy,
- Incorrect LDR paperwork,
- Packaging discrepancy,
- Manifest discrepancies as described in WAC 173-303-370(4)(a) [for offsite shipments unless Permit Conditions II.P.2 can be utilized (Ecology 2004)].

Waste that does not meet the T Plant waste acceptance criteria can be accepted when that waste is scheduled for discrepancy resolution. The discrepancy resolution activities will be tracked to completion (refer to Section 2.5).

2.5 Discrepant Container Management

During the waste acceptance process at the T Plant or another SWOC TSD unit (e.g., CWC, WRAP, or LLBG), an issue can arise where a container will be identified with a discrepant item(s) and will be called a 'discrepant container.' When a discrepant container is identified that would affect the management of the container, the following processes will be initiated:

- Liquids discovered in nonempty containers will be placed in secondary containment that meets the requirements of WAC 173-303-630(7)(a). For combination packages[2], if the liquids are only present within inner containers and no free liquids are present in the outer container, the external container will serve as secondary containment, provided that the combination package can be managed in a manner that meets the requirements of WAC 173-303-630(7)(a) and the compatibility requirements in WAC 173-303-395(1).

- Liquids discovered in nonempty containers of waste destined for disposal at the offsite disposal facility pursuant to the Land Withdrawal Act will be managed according to Section 2.7.5.

- An evaluation will be performed to ensure the compatibility with the other materials in the container and with the outer container in accordance with WAC 173-303-395(1)(b) and will be documented in accordance with WAC 173-303-395(1)(c). Liquids not determined to be compatible with the waste contents or the container will be segregated and placed on separate spill containment.

- If adequate information is unavailable to determine the liquids constitute an imminent hazard, the container will be segregated and placed on separate spill containment and placed as a priority for discrepancy resolution.

[2] A combination package is any configuration where dangerous and/or mixed wastes are confined within (inner) containers, which are in turn stored within secondary, external (outer) containers. Examples include labpacks, certain overpacks, portable spill pallets, or any container configuration that has an outer container with one or more inner containers.

- For waste where the generator can be contacted, the generator will be requested to provide additional information. The container will be dispositioned by either returning it to the generator (provided it can be transported safely and compliantly) or by resolving the discrepancy on the container at a SWOC TSD unit.

- For project waste an evaluation will be performed on available historical data. In addition, interviews could be performed with project points-of-contact, NDE personnel, etc.

- Based upon the evaluation of information (hazards identified) the container will be managed in a safe configuration.

- The container will be scheduled for discrepancy resolution.

2.6 Sampling and Analysis Plans

A sampling and analysis plan (SAP) can be developed outside the WAP to support characterization of waste for various projects. A SAP will provide sufficient detail to ensure that sampling personnel and the analytical laboratory correctly implement the data quality objectives (DQOs) and quality assurance project plan requirements pursuant to TPA Action Plan Section 6.5 (Ecology et al. 2003). Sampling and analysis plans can utilize existing process knowledge and/or analytical data in combination with sampling requirements as identified in the SAP to sufficiently characterize a waste stream for acceptance into a SWOC unit.

2.7 Management of Waste Retrieval Project Waste within Solid Waste Operations Complex TSD Units

The WRP waste has an approved process for the management of waste. Requirements for the development of knowledge documentation for waste streams are part of the process. This WAP does not reiterate the documentation process. Instead, this WAP describes how specific aspects of the documentation process are applied. WRP waste will be managed and processed through SWOC TSD units to make ready for shipment.

The SWOC TSD unit WAPs dictate minimum requirements for waste acceptance. The types of information that can be used for physical/chemical characterization include data from analysis of the waste and knowledge of the materials and/or processes that generate the waste. If the information is sufficient to quantify constituents and characteristics as required by T Plant waste acceptance criteria and meets the definition of 'knowledge' in WAC 173-303-040, the information is considered sufficient.

Waste knowledge must be sufficient to determine the waste stream designation and manage the waste in accordance with T Plant -specific waste acceptance criteria necessary for proper management. This includes, but is not limited to, sufficient knowledge to demonstrate that the waste is not prohibited from management, to segregate waste containers for compatibility, to ensure compatibility of waste within containers, to ensure that the waste can be safely managed, and to segregate waste for treatment, storage and/or disposal. The minimum level of knowledge consists of designation data where the constituents causing a dangerous waste code to be assigned are quantified. This data provides knowledge that addresses any operational parameters necessary for proper management of the waste. When process knowledge indicates constituents are present that cause the waste to be regulated, applicable waste codes are then applied. Characterization can consist of chemical screening and/or sampling as appropriate.

Analytical data and/or knowledge of the waste must be sufficient to determine whether the waste is regulated under 40 CFR 761 and/or WAC 173-303, and to assign correct waste codes. Knowledge must be sufficient to reliably substitute for direct testing of the waste. Knowledge of the waste generating process alone is used to determine whether a waste stream is a listed waste identified in WAC 173-303-080 through WAC 173-303-082. For other waste numbers and for classification under 40 CFR 761, if the available process knowledge is not sufficient to determine whether the waste is regulated and to assign waste numbers, analysis of a representative sample can be performed. The sampling and testing methods outlined in WAC 173-303-110 or other approved methods must be used for the toxicity characteristics, corrosivity, and free liquids. For other characteristic and state criteria designations, when testing is needed, an appropriate method must be used. Appropriate test methods can include SW-846 or test methods which meet or exceed the quality assurance and quality control limits as written in the latest version of SW-846. The test method must be able to meet detection and quantitation limits which are below required regulatory action limits.

Pre-shipment review takes place before waste can be scheduled for transfer or shipment to T Plant. The review focuses on whether the waste stream is defined accurately, meets the T Plant waste acceptance criteria, and the LDR status for mixed and dangerous waste (for WRP waste refer to Section 2.7) is determined correctly. Only waste determined to be acceptable for treatment and/or storage is scheduled. This determination is based on the information provided by the generator. The pre-shipment review consists of the waste stream approval and waste shipment approval process. The following sections discuss the pre-shipment review process. The pre-shipment review ensures the waste has been characterized and the data provided qualify as 'knowledge' (refer to Section 2.1.3).

2.7.1 Waste Stream Approval Process for WRP Waste

The waste stream approval process consists of reviewing stream information supplied on a knowledge document and attached analysis (if available). At a minimum, the knowledge documentation or other approved processes requests the following information:

- Generator information (e.g., name, address, point-of-contact, telephone number)
- Waste stream name
- Waste generating process description
- Chemical characterization information (e.g., characterization method(s), chemicals present, concentration ranges)
- Designation information
- Waste type information (e.g., physical state, absorbents used, inert materials, stabilizing agents used)
- Packaging information (e.g., container type, maximum weight, size)
- Attachments could consist of container drawings, process flow information, analytical data, etc.

This information is developed on a waste stream basis and applied to individual containers prior to transfer. If conformance issues are found during this review, additional information is requested that could include analytical data or a sample to be analyzed. If the waste cannot be received, the T Plant pursues acceptance of the waste at an alternative TSD unit or request the generator to pursue acceptance at an offsite facility or another approved facility.

2.7.2 Receipt of WRP Waste

For container receipt inspection of WRP waste sections are conducted in accordance with Section 2.2.1.

2.7.3 Physical Screening of WRP Waste

Physical screening using NDE described in Section 2.2.2.2 will be used but not as a condition of acceptance into T Plant.

2.7.4 Chemical Screening of WRP Waste

Chemical screening will be used to resolve discrepancies under Section 2.5; however chemical screening is not used to accept this waste into T Plant.

2.7.5 Evaluation of WRP containers with Residual Liquids Destined for Disposal at the Offsite Disposal Facility

The presence of other liquids in WRP waste containers or inner liners destined for disposal at the offsite disposal facility, which readily separate from the non-liquid portion of dangerous waste may be determined by either the paint filter test or through nondestructive examination results. When using nondestructive examination results, containers of WRP waste destined for disposal at the offsite disposal facility found to contain free liquid may be stored without separate spill containment provided that:

- Internal containers or liners contain less than 1 inch or 2.5 centimeters of liquid in the bottom of the container or liner
- Total residual liquid in any payload container (e.g., 55-gallon drum or standard waste box) will be less than 1 percent of the volume of that container
- Daily visual inspections of such containers are conducted.

2.8 Generated Waste

Waste generated by T Plant is considered accepted at T Plant when the waste is generated. Knowledge concerning the generated waste will be entered into the T Plant operating record.

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3.0 SELECTING WASTE ANALYSIS PARAMETERS

Physical/chemical screening parameters for verification must be chosen from those in Sections 3.1 and 3.2. Parameters for waste designation and to meet LDR requirements are addressed in Section 3.3. Each physical/chemical screening result must be in agreement with the shipping documentation to determine the acceptability of the result. Conformance issues identified during the confirmation process are documented and managed in accordance with Section 1.1.1.3. Parameters, methods, and rationale for physical/chemical screening parameters are provided in Table 3-1.

Table 3-1. Parameters and Rationale for Physical and Chemical Screening.

Parameter	Method[a]	Rationale for Selection
Physical Screening		
Visual inspection	Field method – observe phases, presence of solids in waste	Confirm consistency between waste and shipping documentation.
Nondestructive evaluation	Field method	Confirm consistency between waste and shipping documentation.
Chemical Screening		
Ignitability and/or headspace volatile organic compound screening	Organic vapor monitor, colorimetric gas sampling tubes, or a lower explosive level meter	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Peroxide	Field peroxide test paper	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Liquids	SW-846, Method 9095, Paint Filter Liquids Test	Confirm consistency between waste and shipping documentation.
pH	Field pH screen (pH paper method)	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Oxidizer	Field potassium iodide test paper	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Water reactivity	Field water mix screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Cyanides	Field cyanide screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Sulfides	Field sulfide screen	Confirm consistency between waste and shipping documentation; ensure compliance with WAC 173-303-395(1)(b).
Halogenated Organic Carbons	Screening test method for PCBs in transformer oil (SW-846, Method 9079)	Confirm consistency between waste and shipping documentation.

[a] Processes based on manufacturer's recommended methodology for test kit or testing equipment, unless otherwise noted. When regulations require a specific method, the method shall be followed.

3.1 Physical Screening Parameters

The following methods are approved for use in performing physical screening.

(1) Visual inspection (preferred method for physical screening):

Rationale. This method meets the requirement to ensure consistency between waste containers and the accompanying waste stream documentation.

Method: The container is opened and the contents are removed as needed for visual examination. Homogenous loose solids are probed to determine the presence of material not documented on the waste stream documentation, or for improperly absorbed liquids. Visual observations are compared with the applicable profile information and the container specific information in the waste stream documentation.

Failure criteria: A container fails inspection for any of the following reasons; (a) undocumented, improperly packaged, or inadequately absorbed liquids; (b) discovery of prohibited articles or materials listed in Section 1.2; (c) discovery of material not consistent with the applicable waste stream documentation ; and (d) variability greater than 25 percent by volume in listed constituents (e.g., paper, plastic, cloth, metal).

(2) NDE:

Rationale. This method meets the requirement to ensure consistency between waste containers and the accompanying waste stream documentation. This method also is subject to the QA requirements listed in Section 2.2.5. Containers that are not easily amenable to visual inspection because of physical or radiological content, or facility availability can be examined safely and economically.

Method: The container is scanned with a NDE system. Data are observed on a video monitor and captured and recorded. Personnel experienced with the interpretation of NDE imagery record their observations. These observations are compared to the contents listed on the waste stream documentation.

Failure criteria: A container fails the inspection for any of the following reasons; (a) undocumented, improperly packaged, or inadequately absorbed liquids; (b) discovery of prohibited articles listed in Section 1.2; (c) image data not consistent with the applicable waste stream documentation; and (d) variability greater than 25 percent by volume in listed constituents (e.g., paper, plastic, cloth, metal).

3.2 Chemical Screening Parameters

The following methods are approved for use in performing chemical screening tests. Chemical screening is used to verify that incoming waste is consistent with waste stream documentation. Failure of a chemical screening test is defined as a chemical screening result that is inconsistent with the associated waste stream documentation.

(1) Ignitability and/or headspace volatile organic compound screening:

Rationale: To determine the potential ignitability and the presence or absence of volatile organic compounds in waste, and to ensure that personnel are adequately protected. This method is used when containers are opened for inspection. This method can be applied to any matrix.

Method: A sample of the headspace gases in a container is analyzed by one or more of the following types of portable instrumentation: organic vapor monitor, colorimetric gas sampling tubes, or a lower explosive level meter.

Failure criteria: High organic vapor readings in matrices not documented as having volatile organic content constitutes failure.

(2) Peroxide screening:

Rationale: To determine the presence of organic peroxides in solvent wastes, to alert personnel to potential hazards, to ensure safe segregation and storage of incompatible wastes, and to confirm consistency with the waste stream documentation. The test is sensitive to low parts per million ranges.

Method: A peroxide test strip is dampened with a pipet sample of liquid waste. Solids are tested by first wetting the test strip with water and contacting a small sample of the waste. A blue color change indicates a positive reaction. The color change can be compared with a chart on the packaging to determine an approximate organic peroxide concentration.

Failure criteria: Peroxide concentrations greater than 20 parts per million in liquid waste constituents that are known organic peroxide formers not documented as having been stabilized constitutes failure. Results that are not consistent with documented constituents fails verification.

(3) Paint filter liquids test:

Rationale: To verify the presence or absence of free liquid in solid or semisolid material.

Method: To a standard paint filter, 100 cubic centimeters or 100 grams of waste are added and allowed to settle for 5 minutes. Any liquid passing through the filter signifies failure of the test. The required method for the paint filter liquids test is method 9095 in the U.S. Environmental Protection Agency (EPA), SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (the most recently promulgated version) (EPA 1986).

Failure criteria: Failure of the test in waste matrices not documented as having free liquids constitutes failure of the container. Small quantities of condensate trapped in inner plastic liner folds are acceptable.

(4) pH screen:

Rationale: To identify the pH and corrosive nature of an aqueous or solid waste, to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation.

Method: pH measurement is performed in accordance with SW-846. Processes are maintained by the T Plant and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: If the pH of a matrix exceeds regulatory limits (less than or equal to 2.0 or greater than or equal to 12.5) in waste not documented as being regulated for this property, the container fails verification.

(5) Oxidizer screen:

Rationale: To determine if a waste exhibits oxidizing properties, to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation. This test can be applied to waste liquids, solids, and semisolids.

Method: 1 or 2 drops of 3N HCl acid is added to the Oxidizer test paper (potassium iodide, starch). The test paper is touched to a pea size sample of the waste to be tested. A black, blue/black, or purple color change determines a positive oxidizer test. Processes are maintained by the T Plant and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(6) Water reactivity screen:

Rationale: To determine if the waste has the potential to vigorously react with water to form gases or other reaction products. This information is used to ensure safe segregation and storage of incompatible waste, and to confirm consistency with the waste stream documentation.

Method: 2 or 3 drops of distilled water is added to an oxidizer test paper strip. The test paper is touched to a pea size sample of the waste to be tested. The observance of effervescence, a violent reaction, flaming or boiling indicates a positive test. Processes are maintained by the T Plant and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(7) Cyanide screen:

Rationale: To indicate if waste could release hydrogen cyanide on acidification near pH 2. This information is used to ensure safe segregation and storage of incompatible waste and to confirm consistency with the waste stream documentation.

Method: A pea size sample of the waste to be tested is dissolved in a small quantity of water. A mixture of ferrous ammonium sulfate and ferrous ammonium citrate is added to the stoppered test tube. The sample is then shaken and 3N HCl is added to the solution. A dark Prussian blue color change indicates the presence of the acid. Processes are maintained by the T Plant and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(8) Sulfide screen:

Rationale: To indicate if the waste could release hydrogen sulfide on acidification near pH 2. This information is used to ensure safe segregation and storage of incompatible wastes and to confirm consistency with the waste stream documentation.

Method: 5 drops of 3N HCl acid is added to a pea size sample of the waste to be tested. Lead acetate test paper is touched to the sample. A brown or black color change of paper indicates a positive test. Processes are maintained by the T Plant and conform to the requirements of Section 2.2.5, Quality Assurance and Quality Control for Confirmation Process.

Failure criteria: A positive indication in a waste that is not consistent with documented constituents fails verification.

(9) Halogenated Organic Carbons screen:

Rationale: To indicate whether PCBs or other chlorinated solvents are present in the waste. This information is used to confirm consistency with the waste stream documentation and to determine if additional information/data are needed to properly store and treat the waste.

Methods: Field organic chlorine tests appropriate to the matrix, such as those offered by the Dexsil Corporation (e.g., Chlor-N-Oil, Chlor-N-Soil), are used. These screening tests are available with several detection limits that enable the verification to be performed in the concentration range applicable to the proposed management path of the waste.

Failure criteria: A positive indication of chlorinated organics in a waste that is not documented as having chlorinated organic content constitutes failure.

3.3 Other Analysis Parameters

Parameters needed to meet designation, characterization, and LDR requirements for mixed and dangerous waste stored and/or treated at the T Plant are identified in Table 3-2. The most recent promulgated method for SW-846 shall be used.

In determining the characteristic of ignitability, either the Pensky-Martens (method 1010) or the Setaflash (method 1020), must be employed when testing. The characteristic of corrosivity also requires a specific test method. When testing the pH of a given waste stream, method 9040 or method 9045 must be used in accordance with WAC 173-303-090(6).

Compliance with LDR for mixed and dangerous waste that have a treatment standard expressed as constituent concentrations in wastes (CCW) (40 CFR 268.40, incorporated by reference by WAC 173-303-140) can be shown using any appropriate method. If the waste treatment standard is expressed as constituent concentrations in waste extracts (CCWE) (40 CFR 268.40, incorporated by reference by WAC 173-303-140), then the Toxicity Characteristic Leaching Procedure (TCLP) EPA SW-846 Method 1311, which is specifically referenced in 40 CFR 268.41(a), must be performed. Following that, however, any appropriate method may be used to determine concentrations of hazardous constituents in the extract and to show compliance with LDR. Both Cyanides (Total) and Cyanides (Amenable) for nonwastewaters are to be analyzed using Method 9010 or 9012, as incorporated by reference in 40 CFR 260.11. UHCs will be evaluated as required by 40 CFR 268.48.

For other parameters or methods not otherwise specified, the following are acceptable sources of testing methods (standard methods):

- Analytical methods cited in WAC 173-303.

- The most recently promulgated version of *Test Method for Evaluating Solid Waste: Physical/ Chemical Methods*, SW-846, U.S. Environmental Protection Agency, EPA, Office of Solid Waste.

- Other current U.S. EPA methods, as applicable to the matrix under evaluation.

- *Standard Methods for the Examination of Water and Wastewater, American Public Health Association* (APHA), American Water Works Association, Water Environment Federation.

- *Annual Book of ASTM Standards, American Society for Testing and Materials*.

- *AOAC Official Methods of Analysis*, AOAC (Association of Official Analytical Chemists), International.

Appropriate QA/QC documentation is required to be maintained per Section 5.0, regardless of the method used.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at T Plant Complex.

Parameter		Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
General chemistry					
Flashpoint		1010/1020	Liquid	To provide documentation for safe storage conditions	To determine regulatory status as D001 waste, to provide proper waste designation and applicability of LDR requirements
pH	Liquid	9040	Liquid, sludge	To indicate the degree of corrosivity for safe handling; to provide for proper waste designation; and to identify waste that might compromise container integrity	To determine regulatory status as D002 waste, to provide proper waste designation, applicability of LDR requirements and state-only requirements.
	Solid	9045	Solid		
Hydroxide		9040	Liquid	To provide documentation for safe treatment and storage conditions; and to comply with the T Plant waste acceptance criteria.	To provide proper waste designation and applicability of LDR requirements.
Water reactivity		Field method	Liquid, sludge	To determine whether the waste has a potential to violently react with water to form gases or generate heat; to provide documentation for safe treatment and/or storage conditions for waste designation; and to comply with the T Plant is waste acceptance criteria.	To provide proper waste designation; safe storage and management.
Free liquids		9095	Liquid, sludge, solid	To determine applicability of LDRs and for characterization of appropriate treatment	To determine appropriate state-only LDR status of the waste.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at T Plant Complex.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Cyanide	9010/9012	Liquid, sludge, solid	For safe storage; for proper waste designation; applicability of LDR; and characterization of appropriate treatment	To provide proper waste designation and applicability of LDR requirements.
Sulfide	9030	Liquid, sludge, solid	For safe storage; for proper waste designation; applicability of LDR; and characterization of appropriate treatment	To provide proper waste designation and applicability of LDR requirements.
Organic analyses				
PCBs	8082	Liquid, sludge, solid	To determine proper waste designation for management of waste in accordance with the *Toxic Substance Control Act (TSCA) of 1976* and WAC 173-303.	To provide proper waste designation and to meet TSCA and LDR requirements.
Total organic carbon	9060	Liquid, sludge, solid	To determine applicability of LDR and applicability to state-only requirements.	To provide proper waste designation and applicability to state-only requirements, to meet LDR requirements, and comply with the T Plant waste acceptance criteria.
Total organic halides	9020/9021/9022	Liquid, sludge	To determine proper waste designation and applicability to state-only requirements.	To provide proper waste designation and applicability to state-only requirements.
Persistent constituents	9075/9076/9077/ 9211/9212/9214/ 9250/9251/9253			
Total suspended solids	160.2[b]	Liquid, sludge	To determine applicability of LDR and status as a wastewater	To provide applicability of LDR and status as a wastewater.
Volatile organic compounds	1311/8260	Liquid, sludge, solid	To determine proper waste designation, applicability of LDRs, and characterization of appropriate treatment.	To provide proper waste designation, regulatory status, and applicability of LDR requirements.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at T Plant Complex.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Semi volatile organic compounds	1311/8270	Liquid, sludge, solid	To determine proper waste designation, applicability of LDRs, and characterization of appropriate treatment.	To provide proper waste designation, regulatory status, and applicability of LDR requirements.
Chlorinated herbicides	8151	Liquid	Not applicable	To provide proper waste designation and applicability to state-only requirements.
Inorganic analyses				
Arsenic	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Barium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Cadmium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Chromium	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Lead	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.

Table 3-2. Analytical Parameters, Methods, and Rationale for Waste Received at T Plant Complex.

Parameter	Analytical method[a]	Media type	Rationale for selection of waste acceptance parameters	Rationale for analysis
Mercury	1311/7470/6020	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Silver	1311/6010	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Selenium	1311/6010 200.7[b]	Liquid, sludge, solid	To provide for proper waste designation, applicability of LDRs, and for characterization of appropriate treatment.	To determine proper waste designation, regulatory status as a toxic characteristic waste, and applicability of LDR requirements.
Antimony	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.
Beryllium	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.
Nickel	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.
Thallium	6010	Liquid, sludge, solid	To determine applicability of LDR's and for characterization of appropriate treatment	To meet LDR requirements.

[a] Procedures based on EPA SW-846, unless otherwise noted. When regulations require a specific method, the method shall be followed.
[b] EPA-600/4-79/020 (EPA 1983), unless otherwise noted.
LDR = land disposal restriction.
PCB = polychlorinated biphenyls.

4.0 SELECTING SAMPLING PROCESSES

Specific sampling processes and techniques depend on both the nature of the material and the type of packaging. Waste samples are handled and preserved as necessary to protect the sample. For treatment, preservation techniques, and holding times the T Plant shall utilize the processes and techniques recommended in SW-846. This section describes the sampling methodology used to obtain representative samples. DQOs have been established with Ecology in accordance with TPA Action Plan Section 6.5 (Ecology et al. 2003) and have been documented and reflected in this WAP.

4.1 Sampling Strategies

Table 4-1 contains waste forms and sample equipment used to sample referenced waste. Sampling of these waste forms is performed in accordance with Table 4-1.

4.2 Sampling Methods

Samples are processed at one of several laboratories qualified to perform analysis of waste samples (refer to Section 5.0). Sampling methods are those described in WAC 173-303 110(2) and incorporated by reference into this plan.

The basic sampling sequence includes the following:

- Obtain a unique sample number and complete the sample tag before sampling
- Obtain a precleaned sampler and sample bottles
- Attach sample label to sample bottles
- For sampling liquid waste, use a sampler or pipet to sample for two phase liquids. Homogeneous liquids in small containers will be poured into a sample bottle
- For sampling solid waste, use a scoop, trier, or hand auger to obtain a sample of the waste. For large containers of waste, composite several augers or scoops to ensure samples are representative
- Fill sample containers in the following sequence: volatile organics, semivolatile organics, metals, ignitability, pH (corrosivity)
- For solid waste, wipe the exterior surfaces of the sample bottles with a dry rag
- Attach sample labels to outer plastic bags
- Place samples in an appropriate receptacle for transfer to the laboratory
- Complete the chain-of-custody forms
- Seal and mark the receptacle in accordance with WAC 173-303-071(3)(1)
- Transfer receptacle to the analytical laboratory, as appropriate to meet sample holding times

- Properly clean and decontaminate nondisposable sampling equipment or package for return to central sampling equipment decontamination area according to onsite requirements.

4.3 Selecting Sampling Equipment

Sampling equipment selection is detailed in Table 4-1. Sampling equipment needed to sample waste is maintained and decontaminated as necessary by the T Plant to ensure representative samples according to SW-846.

4.4 Sample Preservation

Sample preservation follows SW-846 protocol; however, other approved preservation methods can be used.

4.5 Establishing Quality Assurance and Quality Control For Sampling

This WAP incorporates the requirements of Permit Condition II.E, for QA/QC. Sample collectors prepare a permanent log of sampling activities in accordance with SW-846, Chapter 9.0. Records are maintained in accordance with Section 8.0 of this WAP. Log entries include as appropriate: date of collection, time of collection, location, batch number, sample number, tank number, copy of the chain-of-custody form, sampling methodology, container description, waste matrix (liquid), description of generating process (e.g., decontamination activities), number and volume of samples, field observations, field measurements (e.g., pH, percent lower explosive limit), laboratory destination and laboratory number, and signature. These log entries are made by the appropriate personnel while the sampling is performed. The logs or copies of logs are maintained in the T Plant operating record after completion of sampling activities.

A chain-of-custody record accompanies samples at all times. The T Plant shall maintain written chain-of-custody processes to ensure accountability of waste sample handling and to ensure sample integrity. All samples are labeled with a unique identifier.

During all sampling activities, strict compliance with applicable industrial hygiene and safety standards is mandatory. Appropriate sampling and decontamination processes are used.

The following QA/QC elements are used by the T Plant to ensure sampling activities for designation purposes result in acceptable laboratory data:

- Representative sampling methods as defined by WAC 173-303-110(2); 40 CFR 261 Appendix I; and/or SW-846 Chapter 9.0
- Appropriate sample containers and equipment
- Samples numbered
- Traceable labeling system
- Field QA/QC samples (applicable SAP)
- Equipment calibration (current as appropriate)
- Chain-of-custody.

Table 4-1. T Plant Chemical Screening Sampling Equipment.

Waste form	Reference in SW-846, Chapter 9.0	
	Waste type	Equipment*
Liquids	Free-flowing liquids and slurries	COLIWASA, glass thief or pipet
Solidified liquids	Sludges	Trier, scoops and shovels
Sludges	Sludges	Trier, scoops and shovels
Soils	Sand or packed powders and granules	Auger, scoops and shovels
Absorbents	Large-grained solids	Large trier, scoops and shovels
Wet absorbents	Moist powders or granules	Trier, scoops and shovels
Process solids and salts	Moist powders or granules	Trier, scoops and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, scoops and shovels
	Large-grained solids	Large trier, scoops and shovels
Ion exchange resins	Moist powders or granules	Trier, scoops and shovels
	Dry powders or granules	Thief, scoops and shovels
	Sand or packed powders and granules	Auger, scoops and shovels

COLIWASA = composite liquid waste sampler.
* other ASTM-approved equipment could be used to collect samples.

The equipment requirements of Table 4-1, as amended by any Permit conditions, apply to sampling for chemical screening. In addition, the following sampling equipment may be used in sampling for chemical screening: (1) For liquids and slurries – dip, tank, bomb, and bailer samplers, as well as tube-type samplers (e.g., thin-walled Shelby tubes, split spoons, probes); and (2) For sludges and solids – tube-type samplers and augers; for small containers, a spoon may be used in place of a scoop.

5.0 LABORATORY SELECTION AND QUALITY ASSURANCE/QUALITY CONTROL

The selection of any laboratory shall be based on the ability of the laboratory to demonstrate compliance to this section with experience and capability in the following major categories:

- Comprehensive written QA/QC program
- Technical analytical expertise
- Effective information management systems.

The QA and QC requirements outlined in this section are applicable to laboratory activities governed by this WAP.

5.1 Evaluation of Laboratories

All laboratories providing analytical support to the T Plant are required to have a current, laboratory approved QA plan. The laboratory QA plan shall be submitted to the T Plant, and if necessary to Ecology in accordance with TPA Action Plan Section 6.5 (Ecology et al. 2003), for review and acceptance before commencement of analytical work. The QA plan shall, at a minimum, address the following elements:

- Sample custody and management practices (also refer to Section 4.0)
- Sample preservation protocols
- Sample preparation and analytical process requirements
- Instrument maintenance and calibration requirements
- Internal QC measures, e.g., method blanks, spikes
- Corrective action process.

Each laboratory shall be audited periodically by an independent organization to evaluate the effective implementation of the laboratory's QA/QC program. QA personnel and a technical expert shall evaluate the laboratory through onsite observations and/or reviews of the following documentation: copies of the QA/QC documents; records of surveillances/inspections; audits; non-conformances, and corrective actions. The T Plant shall ensure independent organizations; QA personnel and technical experts are qualified to perform these evaluations.

5.2 Quality Assurance/Quality Control Objectives

The overriding goal of the analytical program is to support the accurate designation of waste and/or demonstrate compliance to LDR standards. Laboratory QA/QC programs shall be designed to meet the following objectives.

- Minimize errors. Errors could be introduced during preparative, analytical, and/or reporting phases of work. QC program elements include analysis of samples to written and approved processes and certification of the laboratory.

- Provide information. The designation of waste relies on a combination of knowledge and data. QA/QC programs that ensures accurate, precise, reliable, and reproducible data.

Key QA program elements are designed to provide objective evidence that waste analysis methods meet the performance specifications of the T Plant. QA activities and implementation responsibilities are as follows:

- Activity based laboratory inspections. Inspections are performed by the T Plant. Inspections verify that specific guidelines, specifications, or processes for the activities are completed successfully.

- Laboratory analyses. Analyses are performed by onsite or offsite laboratories on samples of waste using written and approved processes.

- Development of inspection checklists. Checklists are required for laboratory inspections and are designed to ensure that the inspected activity is consistently addressed. Checklists are completed during the inspection to document results.

- Instrument calibration and calibration verification. These activities are performed by the laboratory and are required for ensuring data of known accuracy and precision. Calibration data are maintained and stored to ensure traceability to reported results.

5.3 Laboratory Quality Assurance/Quality Control

All analytical work shall be defined and controlled by a statement of work, work order, or other work authorizing documentation. These authorizations documents shall include QA performance requirements. Samples will be handled according to approved, written and controlled laboratory processes. The accuracy, precision, and limitations of analytical data are evaluated through QC performance.

As needed, the T Plant will conducts analyses to determine completeness of information and whether waste meets the acceptance criteria for treatment, storage, or disposal at one of the Hanford Facility TSD units or those of a chosen offsite TSD facility. Testing and analytical methods will depend on the type of analysis sought and the reason for needing the information. For parameters or methods not otherwise specified in Section 3.0, the following are acceptable sources of testing methods (standard methods).

- Analytical methods cited in WAC 173-303;

- The most recently promulgated version of *Test Method for Evaluating Solid Waste: Physical/ Chemical Methods*, SW-846, U.S. Environmental Protection Agency, EPA, Office of Solid Waste;

- Other current U.S. EPA methods, as applicable to the matrix under evaluation;

- *Standard Methods for the Examination of Water and Wastewater, American Public Health Association* (APHA), American Water Works Association, Water Environment Federation;

- *Annual Book of ASTM Standards, American Society for Testing and Materials*;

- *AOAC Official Methods of Analysis*, AOAC (Association of Official Analytical Chemists), International.

Other laboratory approved, written and controlled analytical methods, proprietary methods, and non-standard methods may be needed to develop operational and safety related information.

5.4 Data Assessment

Data used for decision making need to be scientifically sound, of known quality, and thoroughly documented. Data validation is not required; however, the T Plant is responsible to ensure that data assessment or evaluation is completed. Data are assessed to determine compliance with quality standards approved by Ecology and established by this Permit in Section 5.3 are as follows.

Precision – The overall precision shall be the agreement among the collected samples (duplicates) for the same parameters, at the same location, subjected to the same preparative and analytical techniques. Analytical precision shall be the agreement among individual test portions taken from the same sample, for the same parameters, subjected to the same preparative and analytical techniques.

Accuracy – Accuracy of the measurement system shall be evaluated by use of various kinds of QA samples, including, but not limited to, certified standards, in-house standards, and performance evaluation samples.

Representativeness – Representativeness addresses the degree to which the data accurately and precisely represent a real characterization of the waste stream, parameter variation at a sampling point, sampling conditions, and the environmental condition at the time of sampling. The issue of representativeness is addressed for the following points:

- Based on the generating process, the waste stream, and its volume, an adequate number of sampling locations are selected;
- The representativeness of selected media has been defined accurately;
- The sampling and analytical methodologies are appropriate;
- The environmental conditions at the time of sampling are documented.

Completeness – Completeness is the amount of usable data obtained from a measurement system compared to the total amount of data requested.

Comparability – Comparability is the confidence with which one data set can be compared to another. This usually is accomplished by application of statistical methods.

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6.0 SELECTING WASTE RE-EVALUATION FREQUENCIES

The waste profile and supporting data and documentation shall be re-evaluated at least annually, or more often, if the generator has informed the T Plant of a change in the waste generation process, or if waste received at the T Plant or the description on the shipping documentation does not match the waste profile. If the generator has informed the T Plant of a change in the waste generation process, the waste re-enters the waste stream approval process described in Section 2.1.1. The T Plant will evaluate verification data against the waste profile to identify any waste streams for which a change in waste generation process is suspect. If a waste stream is suspect, that waste stream will re-enter the approval process described in Section 2.1.1.

When a waste profile is re-evaluated, the T Plant could request the generator to do one or more of the following:

- Verify accuracy of current waste profile;
- Supply a new waste profile;
- Submit a sample to confirm the waste is still within the profile parameters.

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7.0 SPECIAL WASTE ANALYSIS PROCEDURAL REQUIREMENTS

This section discusses any special process requirements for receiving mixed waste at the T Plant.

7.1 Processes for Receiving Onsite and Offsite Waste

The processes for receiving waste are described in Section 2.0. In general, mixed waste received from onsite generators is managed the same as waste received from offsite generators. Differences include, but are not limited to the following: (1) physical/chemical screening frequencies for verification [minimum percentages of 5 percent for waste from onsite generators and 10 percent for waste from offsite generators (note that chemical screening frequency depends on the physical screening frequency)], (2) shipping documentation (Uniform Hazardous Waste Manifests are used for waste from offsite generators and shipping documents are used for waste from onsite generators), and (3) LDR documentation requirements for mixed or dangerous waste (notification for waste from offsite generators and equivalent information from onsite generators).

7.2 Processes for Ignitable, Reactive, and Incompatible Waste

The T Plant accepts ignitable, reactive, or incompatible waste (refer to Section 1.2). Pre-shipment review and/or chemical screening requirements in Section 2.0 are used to identify whether the waste is ignitable, reactive, or incompatible. The T Plant waste acceptance criteria identifies certain management requirements for ignitable, reactive, and incompatible waste, ensuring the waste is stored in a safe manner. Precautions are taken when ignitable, reactive, or incompatible waste is stored within the T Plant.

7.3 Provisions for Complying With Federal and State Land Disposal Restriction Requirements

State-only and federal LDR requirements restrict the land disposal of certain types of waste subject to *Resource Conservation and Recovery Act* (RCRA) *of 1976* and the *Hazardous Waste Management Act of 1976*. Waste managed on the Hanford Facility falls within the purview of these LDRs per 40 CFR 268 and WAC 173-303-140. Waste constituents that are subject to LDRs are identified in 40 CFR 268.40 and referenced by WAC 173-303-140. Waste must meet certain treatment standards, as specified in 40 CFR 268 and/or WAC 173-303-140, if the waste is to be land disposed.

Generators determine if LDRs apply to the mixed or dangerous waste based on knowledge or testing [40 CFR 268.7(a)]. Each waste is analyzed for those LDR constituents contained in the listed and characteristic waste numbers identified by the generator, including any UHC identified by 40 CFR 268.2(i), if the knowledge of the generator is not sufficient to make a determination. If the LDR waste does not meet the applicable treatment standards, the generator provides waste information with each shipment stating so in accordance with WAC 173-303-380(1)(j),-(k),-(l),-(m),-(n), or -(o). If the waste meets the LDR standards, the generator must send a certification that the waste meets the treatment standards.

7.3.1 Waste Treatment

Waste is treated to meet LDR as specified in 40 CFR 268 and WAC 173-303-140 with the exception of mixed waste designated by the Secretary of Energy for a disposal facility pursuant to the *Land Withdrawal Act*, as amended.[3] Mixed waste is treated to the applicable standards required by the disposal facility or

[3] Subject to "*State of Washington v. Bodman,*" presently on appeal before the United States Court of Appeals for the Ninth Circuit, No. 06-35227.

other applicable requirements. The T Plant potentially can partially treat or pre-treat certain waste before shipment to a permitted offsite facility that could perform full treatment of the specific waste to meet LDR treatment requirements. Waste requiring treatment other than what the T Plant can provide is repackaged, labeled, and transferred to a TSD unit for storage pending identification or development of an appropriate treatment. Prior to treatment of waste, the T Plant will have in place processes to ensure safe waste treatment as defined in Section 1.1.3 of this WAP. When characteristics of the waste are changed as a result of treatment or other processing, documentation will be entered into the unit-specific operating record. Dangerous waste is shipped to an offsite TSD for treatment.

When evaluating the treatability of certain characteristic waste, consideration must be given to any additional UHCs that might be found in certain characteristic waste. The treatment standards, for the most part, are concentration-based. When the concentration-based standards are used, the constituent concentrations for the waste must fall below those specified in 40 CFR 268.40 and/or 268.48 for UHCs and in WAC 173-303-140 for land disposal without treatment. If the concentrations exceed these limits, the waste must be treated before disposal. The alternative treatment standards for hazardous debris as specified in 40 CFR 268.45 or for contaminated soil as specified in 40 CFR 268.49, or for labpacks in 40 CFR 268.42(c) could also be used.

Treatment can consist of, deactivation (neutralization, cementing, absorption), stabilization (cementing, absorption, and encapsulation); compaction, sorting, and repackaging of waste.

Deactivation is used to remove the hazardous characteristics of the waste due to its ignitability (D001), corrosivity (D002), solid corrosive acid (WSC2), and/or reactivity (D003). Treatment techniques could include neutralization, absorption, cementing, controlled reaction with water, and macro-encapsulation.

- Neutralization is the primary method of treatment for corrosive waste that has a pH less than or equal to 2 and/or greater than or equal to 12.5. Examples of bases that could be used to neutralize acids are sodium hydroxide, calcium hydroxide, or calcium carbonate. Examples of acids that could be used to neutralize bases are hydrochloric acid and sulfuric acid.

- Absorption is the primary method of treatment for ignitable waste, which include waste that is liquid and has low total organic carbon content (less than10 percent). Absorbent material that could be used includes polyacrylates, polypropylene, superabsorbent polymer, cellulose, or other absorbent materials that meets applicable disposal requirements.

- Cementing or grouting is the primary method of treatment for ignitables consisting of metal fines or other corrosive materials. These types of waste are deactivated by mixing and binding it with an inert cementacious material.

- Encapsulation is a treatment for debris.

Stabilization methods used by the T Plant include cementing or grouting, sealing, and absorption. Particulates and/or liquid waste containing hazardous constituents could be cemented or grouted at the T Plant to meet either disposal facility waste acceptance criteria, and/or the disposal criteria of future TSD units. These types of waste are stabilized by mixing and binding the waste with an inert material. The inert material generally used is Portland cement. When dealing with some waste streams, such as sludges that might contain an inconsistent or excess liquid content, absorbent could be added to the waste to provide a drier matrix to allow identification of the proper combination of ingredients to ensure a successful stabilization effort.

Treatment of state-only extremely hazardous waste (WT01, WP01, and WP03) is performed in accordance with Revised Code of Washington (RCW) 70.105.050(2) for mixed waste and/or WAC 173-303-140(4)(a) for dangerous waste as applicable.

Waste managed at the T Plant is treated to meet either concentration-based treatment standards or technology-based standards. The alternative treatment standards for hazardous debris as specified in 40 CFR 268.45 or for contaminated soil as specified in 40 CFR 268.49 also could be used. When dealing with multiple dangerous waste numbers, both standards could apply, requiring a treatment train for ultimate compliance to LDR. In most cases, stabilization treatment is at the end of the treatment train. In some instances, as with the cementing process, treatability studies could be performed to ensure that when the waste is treated, LDR requirements are met.

Grab samples are collected on each batch of concentration-based treated waste to ensure that the treatment process was successful. For specified technologies, the T Plant operating record contains information to demonstrate the treatment process was well designed and well operated.

7.3.2 Sampling and Analytical Methods

Section 3.3 defines the parameters and methods needed to demonstrate compliance to LDR treatment standards. It is recognized that ALARA concerns may warrant modifications to the methods to ensure appropriate protection of personnel health and safety without impact to the method or sample integrity. Waste analyzed using SW-846 methods modified to address ALARA protection concerns are considered acceptable provided applicable data quality objectives can be met.

Samples of waste are transferred to the sample management area for packaging and transferred to an onsite laboratory or shipped offsite to a laboratory for analysis. Samples are collected in accordance with SW-846 and as described in Section 4.0. Storage is provided for waste containers while waiting laboratory analysis results.

7.3.3 Land Disposal Restriction Certification of Treatment

When LDR treatment has been completed and analytical results (if applicable per 40 CFR 268.40 and WAC 173-303-140) have verified the LDR treatment is successful, certification of the LDR treatment is required by the T Plant. The certification statement is prepared by the unit in accordance with 40 CFR 268.7b, d, and e. A copy of the certification is placed in the T Plant operating record.

When a LDR waste does not meet the applicable treatment standards set forth in 40 CFR 268.40 and WAC 173-303-140, or exceeds the application prohibition levels set forth in 40 CFR 268.32 or Section 3004(d) of RCRA, this information is placed in the T Plant operating record, in accordance with WAC 173-303-380(1)(k), (n), and -(o).

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8.0 RECORDKEEPING

Recordkeeping requirements applicable to this WAP are described in the *Hanford Facility RCRA Permit*, Attachment 33, General Information Portion, Table 12.1 (Ecology 2004) and this WAP.

The T Plant maintains the waste stream documentation or other approved processes, supporting documentation, and associated QA/QC data described in this WAP in accordance with the requirements in Permit Condition II.I (Ecology 2004).

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9.0 REFERENCES

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